EMERGING TECHNOLOGIES IN LANGUAGE PEDAGOGY: LANGUAGE LEARNERS' PERCEPTIONS THROUGH THE LENSES OF INNOVATION DIFFUSION AND USER INTENTION THEORIES

by

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“we’re here to put a dent in the universe; otherwise, why else even be here?”

—steve jobs

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ABSTRACT

Recently, it has been admitted by many researchers that students today are "digital natives" who already utilize several different technologies everyday with different purposes. Furthermore, while there is a plethora of research about learners' perceptions in language pedagogy, there is a paucity of information and research that could move beyond generic perception studies especially regarding new technologies. Accordingly, educators are still concerned not only with how to encourage EFL learners to adopt emerging technologies that could be invaluable in their language learning processes, but also with how to keep students interested in what they are learning. Thus, an understanding beyond students' perceptions with a purposive focus on their approach to technology by also exploring factors that have an influence on their adoption of emerging technologies is the key to knowing how to motivate students to integrate new technologies, and how to keep students interested in the learning process. Therefore, the purpose of this study was three-fold: to identify language learners' approaches to technologies; to examine their attitude toward emerging technologies with a focus on their familiarity, actual use, intentions and perceptions; and finally to analyze the factors and relationships among these factors that best predict language learners' intentions and decisions to use emerging technologies. The study specifically aimed to explore the following emerging technologies: (a) social networking, (b) mobile learning, and (c) digital games as major emerging technologies of today with also a focus on other emerging technologies: (a) augmented reality, (b) wearable technologies, (c) virtual assistants, (d) massive online open courses, (e) 3D printing and (f) online language learning platforms.

This mixed methods study benefitted from multiple disciplines, and presented several different perspectives to achieve its aim. The data were obtained through a survey, open-ended

questions, and semi-structured interviews. The quantitative data were analyzed through descriptive and inferential statistics. In addition, structural equation modeling was utilized and path analysis was employed to draw on two complementary frameworks: innovation diffusion theory (Rogers, 2003), especially its application in technology adopter categories (TACI) (Dugas, 2005), and the decomposed theory of planned behavior (DTPB) (Taylor & Todd, 1995), which was adapted for this research. The qualitative data was analyzed through thematic content analysis, and used to triangulate and affirm what the quantitative data was showing.

The findings indicated that technology adopter categories were normally distributed among EFL learners at a public and a private university in Turkey. Although most EFL learners were quite familiar and confident with major emerging technologies, they were not very familiar with minor emerging technologies. As for an awareness of the benefits of all listed emerging technologies, the study revealed that EFL learners' awareness is quite high; however, it was also found that participants' intention to use these emerging technologies and their actual use were very low. Finally, the results showed that the adapted DTPB was useful in explaining much of the variance in the intention to integrate technology into language learning processes by EFL learners, and attitude was the most important predictor and factor of behavioral intention. Given these findings, this research aims to contribute to the literature in innovation diffusion, user adoption and language pedagogy by offering several theoretical, methodological, and pedagogical implications and directions for future research and applications.

Keywords: emerging technologies, English as a foreign language, social networking, mobile technologies, digital games, Decomposed Theory of Planned Behavior, Technology Adopter Category Index

CHAPTER ONE:

INTRODUCTION

1.1 Overview of the Chapter

This study, first, aims to identify language learners' approaches to emerging technologies. In addition, it examines learners' attitude toward emerging technologies with a focus on their familiarity, actual use, intentions and perceptions. Finally, this research seeks to investigate factors and relationships among these factors that predict language learners' intentions to use emerging technologies to support their language learning processes. The study specifically focuses on social networking, mobile learning, and digital games as today's major emerging technologies with also a focus on other emerging technologies such as augmented reality, wearable technologies, virtual assistants, massive online open courses, 3D printing and online language learning platforms. The present chapter begins with a background that frames the study and the reasons for this research, followed by the purpose of the study and accompanying research questions. The chapter concludes with the significance of this research study and an overview of the chapters.

1.2 Background of the Study

Rapid evolution of communication technologies has changed the nature and context of language pedagogy and also learner's perception of new technologies that can be used in teaching and learning processes. Accordingly, many studies in the past have shown that technology use in the classroom has increased exponentially over the past years; however, this

use has been primarily limited to content delivery such as accessing course materials especially during the early years of technology use in language pedagogy (Maloney, 2007). Later on, Internet technologies such as e-mail, course websites, and news-groups have added value to traditional classroom knowledge delivery and have impacted the course delivery and design in many colleges and universities (Barnett et al, 2004). Finally, the advent of Web 2.0 technologies such as wikis, blogs, social networking, etc. have enabled students to connect different pieces of information and create new information that could be shared with others (Maloney, 2007). According to Conole and McAndrew (2010), the affordances of Web 2.0 technologies are aligned with the concepts of good pedagogy of socio-constructivist approaches, which is why these technologies are very appealing for learners today.

Along with the rapid development of information and communication technologies, educators are trying to keep up with the dramatic changes in our electronic environment (Han, 2012). Today, there are numerous emerging technologies that are free and web-based. What makes these tools valuable is not only their easy availability but also their potential to support meaningful learning, as well as increased collaboration, interaction and active participation (Czerkawski, 2013). Although technology evolves at an increasingly faster pace, research makes a gradual progress in terms of paralleling these innovations. Thus, it seems to be a challenging task to make a definition of emerging technologies of today and to list what goes under this classification. As one of a few reference points regarding most recent technologies, Horizon Reports updated every year by the New Media Consortium and similar publications are referred to in identifying what emerging technologies are focused on in several different studies and also in this study. The technologies to be focused on in this study are not limited only to the current year but also cover the most recent years since some of the technologies have not achieved a

wide recognition and application within classrooms or educational contexts. Based on the Horizon Reports of the last seven-year period (see Table 3.1), there are new technologies that might have an educational relevance and have several affordances in terms of language pedagogy.

As stated by Czerkawski (2013), from the pedagogical perspective, it is essential to recognize emerging technologies and tools as a way of enabling new types of information and messages in the learning process. To this end, it becomes a sophisticated task to research about the effectiveness of emerging technologies based on how they are used by language learners today. Learners today are labeled "digital natives" while most educators may be considered "digital immigrants", and there seems to be a digital divide between these mutual groups. Emerging technologies that have the potential to deliver complex messages in line with today's complex world have the capacity to deliver messages that are personalized and learner-centric and also the capacity to reduce the digital divide between educators and learners (Czerkawski, 2013). However, the knowledge of the true potential of emerging technologies and how it can contribute to the elimination of the digital divide can only be possible through research, and this study aims to achieve this purpose. Within the boundaries of the existing research and the current literature, there is a need for this study due to four main reasons.

First, technology, as Warschauer (2000) writes, is both a contributor to and a result of the broader socioeconomic changes that affect the entire context and ecology of language teaching today. Chapelle (2003) underlines the prevalence of technology by stating that everyone needs technology skills –secretaries, car mechanics, insurance adjustors, and political analysts. Accordingly, Goodwyn (2000) claims that the key changes in technology have not been in schools, but they have been in the work and domestic environments where the computer has

become a normal, ordinary and integrated element. Most schools have been left far behind, and teachers constantly lament their incompetence in achieving a wider adoption of technology, especially new technologies by learners. Therefore, although computers have been used for language teaching since the 1960s (Warschauer & Healey, 1998), there is still indeed a strong need to experiment with technology and digital tools in both education and language learning as also suggested by several studies (Godwin-Jones, 2012; Goertler, 2009; Levy, 2009; Reinhardt & Ryu, 2013; Zhao, 2003).

Second, Rankin (2010) admits that the current information shift is as drastic as the move from handwritten texts to books from the printing press (as cited in Fargo, 2012). Advances in technology have revolutionized the way in which language learners learn, play, communicate, and socialize. As Ito (2008) illustrates, technological gadgets, mobile phones, and participation in social network sites are now fixtures of youth culture. As a result, studies and research focusing on especially the most recent technology could easily become obsolete in a few years. Currently, the technologies of the past few years or even today's technologies are not considered new and emerging, and there are several studies dealing with their pedagogical values and the beliefs of learners, teachers or administrators. Some studies have focused on new and emerging educational technology in general (Blasing, 2010; Burston, 2013; Chinnery, 2006; Fargo, 2012; Gibson, 2010; Goertler, 2009). Some of them have had a specific focus on the perceptions and beliefs of learners toward using technology in language learning activities (Aydin, 2007; Butt, 2014; Hsu, 2013; Prensky, 2001a), and some other studies have been specifically about teachers' perceptions and beliefs toward the pedagogical values of educational technologies (Sadaf et al., 2012; Ajjan & Hartshorne, 2008). However, most of these studies have had a focus on technologies such as Web 2.0 technologies (Ajjan & Hartshorne, 2008; Sadaf et al., 2012;

Stevenson & Liu, 2010), and some have investigated technologies such as e-mailing, Internet chat, and even texting (Goertler, 2009; Chinnery, 2006; Levy, 2009). It is a fact that technology is quickly evolving, and the technologies of the past few years could quickly become obsolete and out-of-date. Furthermore, the concept of emerging technologies always refers to new and unexplored technologies, and it seems there is not sufficient research to demonstrate their pedagogical effectiveness as there have been with the emerging technologies of the past few years. As a result, there is also a need to identify most recent technologies and to update the concept of emerging technologies in accordance with relevant research and studies, and this is another important point regarding research on emerging technologies in language pedagogy.

Third, most educators, parents and even researchers assume that students today are characterized as 'digital natives' (Prensky, 2007) or the 'net generation' (Oblinger, 2003). In other words, students who have used computers and the Internet all their lives are completely different from those who haven't had that experience. Prensky (2001a) makes further claims by stating that today's students are no longer the people our educational system were designed to teach. He also argues that digital natives' brains are likely *physically different* as a result of the digital input they received growing up (Prensky, 2001b), and that as a result educators need to reconsider methodology and content and teach through games and all new digital tools (Prensky, 2001a). However, based on how the concepts of digital natives and the digital divide have been overgeneralized (VanSlyke, 2003), the assumption that every piece of digital technology integrated into language pedagogy, no matter how meaningfully it is done, would be welcomed by today's learners does not necessarily reflect a consensus among researchers in education and language pedagogy. So far, regarding learners' perceptions toward new and emerging technologies and their integration into language pedagogy, studies mentioning emerging

technologies such as social networking sites (SNSs) (Eren, 2012; LeNoue et al., 2011; Mitchell, 2012), mobile learning (ML) (Hsu, 2013; Jung, 2014; Kim et al., 2013), digital games (DGs) (Liu, 2014; Warschauer & Liaw, 2011), and other emerging technologies such as augmented reality (Mouza & Lavigne, 2013), MOOCs (Stevens, 2013), wearable technologies (Chinnery, 2006) etc. reveal both positive and negative reactions from learners. In order to avoid overgeneralization, there is a need to focus on language learners' perceptions and analyze the factors that have influenced their decisions or intentions to use certain emerging technologies to learn a language. Hence, this becomes the third most significant aspect of research on emerging technologies in language pedagogy.

Finally, since the time computers first started to be used in 1960s in language pedagogy (Warschauer & Healey, 1998), SLA researchers have long been studying perspectives, attitudes, and beliefs of both learners and teachers toward new technologies with diverse non/empirical research. However, they have done this research without a robust theory or a model. As stated by Lai (2013) in her study, which is among a limited number of studies that adopted and developed a robust user intention model, what is missing is a conceptualization of different motivating factors and potential interactions of these factors when predicting language learners' use of technology for learning. This lack of research and the need for a well-established model lead to difficulties in comparing the effectiveness of a certain technology since it is hard to reach comparative effect sizes, power analysis and all other statistical measures. Hence, there is a need in language pedagogy to develop a model that might effectively analyze learners' perceptions and behaviors in the adoption and use of emerging technologies in their own language learning processes. This brings us to the last point pertaining to research on emerging technologies in language pedagogy.

All in all, it is clear that research in language pedagogy should focus on the use of technology that is currently an indispensable part of education. Secondly, since several technologies have been extensively researched for a long time, there is a need to focus on emerging technologies in order not to fall behind technological progress made in non-educational environments. Thirdly, rather than overgeneralizing today's learners as digital natives, or as members of the net generation who are expected to welcome any kind of technology, research in language pedagogy should target learners' perceptions and underlying factors influencing their intentions and decisions. Finally, there is also a very strong need to develop a parsimonious theory and a model to statistically compare the effectiveness of using emerging technologies in language pedagogy with a focus on specific target audiences. As a result, in order to fulfill the above-mentioned needs and to contribute to the scholarly research in language pedagogy, this study aims to focus on language learners' approach to technologies in general, their attitude toward emerging technologies that are elaborated in the following chapters with a focus on their familiarity, actual use, intentions and perceptions, and finally to analyze the factors that best predict language learners' intentions and decisions to use emerging technologies.

1.3 Purpose of the Study

With the background information detailed above and the portrayal of the needs for this research, the purpose of this study is three-fold: to identify language learners' approaches to technologies; to examine their attitude toward emerging technologies with a focus on their familiarity, actual use, intentions and perceptions; and finally to analyze the factors and relationships among these factors that best predict language learners' intentions and decisions to use emerging technologies. Hence, in light of the current research and emerging technologies listed above, the present study will focus on the following research questions:

1. How do language learners approach emerging technologies in general?
2. How do language learners perceive emerging technologies used for learning a foreign language?
3. What factors best predict language learners' intentions to use emerging technologies?

1.4 Theoretical Frameworks

Two complementary theoretical frameworks were utilized to address research questions in this study. First, technology adopter categories in addition to an index based on these categories (TACI) were chosen as a theoretical framework, and a rubric was adapted to collect data in an effort to analyze EFL learners' approach toward using technologies in general. The adopter categories themselves are a means of convenience in describing the members of a system and grounded on the innovation diffusion theory (IDT) most commonly associated with the name, Everett Rogers (Dugas, 2005). Rogers' book titled *Diffusion of Innovations* in its fifth edition (Rogers, 2003) indicate that adopters of innovations, including new technology, fall into five categories: innovator, early adopter, early majority, late majority, and laggard. These diverse categories will be described, and relationships among categories will be explained further in the methodology chapter. As for the significance of TACI, Kim and colleagues state that, in order to accommodate and support these diverse adopters, understanding their characteristics in the process of adopting an innovation is essential, especially when educators seek to promote successful personal learning with new technologies. In this study, TACI was used to understand the learners of English as a foreign language (EFL) and to help analyze data based on a 9-point TACI scale adapted in line with the purpose of the study.

As for the second framework, the decomposed theory of planned behavior (DTPB) was used to investigate factors predicting EFL learners' intentions to use given emerging

technologies. Indeed, behavioral intention theories have been developed in social psychology as a way to explain or predict intention to perform a specific behavior (Paver, 2012). User intention theories and the DTPB appeared as a result of innovation diffusion studies, and how the DTPB came into being and all the other user intention theories developed prior to the DTPB will be described in detail in the second chapter. Chapter Three will also present how the original DTPB model (Taylor & Todd, 1995) was adapted for this study. The DTPB (Taylor &Todd, 1995) as a comprehensive model including all the important constructs of previous models that might influence language learners' intentions to use technology provides a comprehensive way to understand how an individual's attitude, subjective norms and perceived behavioral control can influence his or her intention to use technology (Sadaf, 2013). However, it is still a fact that DTPB as one of the most recent versions of all user intention theories overlooks emotional and some other contextual variables, and accordingly three more constructs were added to the existing model in an effort to better identify and explore EFL learners' intentions and decisions to use three major emerging technologies: social networking sites, mobile learning, and digital games.

As also stated by Paver (2012), since innovation diffusion and user intention theories had yet to be used in research on EFL learners' adoption of technology, it was not known if this family of theoretical models could serve as good predictors of technology use for this specific population. Hence, it was important to design a research study that tested a user intention theoretical model as a way of predicting EFL learners' adoption of emerging technologies in their language learning processes. As a result, first, TACI was selected to understand EFL learners' approach toward using technologies in general and their characteristics based on their adopter categories. Second, the DTPB was selected and adapted based on prior research that

suggested the predictive value of this model, based on the design of the model to address the use of emerging technologies, and based on the enhanced generalizability of findings attributed to the decomposed belief structures (Taylor & Todd, 1995). In addition, both the technology adopter category index and the adapted decomposed theory of planned behavior served as the foundation for the development of the survey instrument used in this study.

1.5 Significance of the Study

This research study is unique in the sense that it is the first study in language pedagogy to utilize the Decomposed Theory of Planned Behavior, which is the most evolved form of user intention theories. In fact, user intention theories and related models have been used very extensively in many different fields including information technology and education technology in order to analyze factors influencing users' intention to adopt technologies and innovations, but they have rarely been used in research in language pedagogy. The adapted DTPB as a very comprehensive and validated model together with Innovation Diffusion Theory utilized in this study should inform and guide research in language pedagogy and present a very well-established and parsimonious model to be used with not only language learners but also teachers and administrators in the adoption of any kind of innovations in future research studies.

Additionally, as previously mentioned, there have been several studies in language pedagogy that focus on language learners' attitudes, beliefs and perceptions toward new technologies. In addition to the fact that only few of these studies utilized a robust and parsimonious theory or a model, it is also a fact that these studies focused on technologies such as using e-mails, texts, blogs, social networks and most recently Web 2.0 technologies. Although these technologies are still quite new for some, due to the speed with which technology develops, there are several other emerging technologies to be examined. Therefore, this study is also

unique in the sense that numerous emerging technologies are explored through the above-mentioned parsimonious theories and models.

Finally, this research study uses a mixed methods approach with a combination of quantitative and qualitative methods, which will provide teachers, teacher educators, administrators, program designers, and technology developers with a very comprehensive picture of the factors that influence language learners' intentions to adopt emerging technologies.

1.6 Definitions of Key Concepts

It is important to clarify some of the important terms that are used throughout the subsequent chapters of this dissertation.

Emerging Technologies: The term "emerging" is used to encompass both technologies whose integration in classroom settings is now being investigated as well as technologies whose integration has been researched but not exhaustively. In all instances, the focus is on technologies that are viewed as having the capacity to significantly influence the processes and outcomes of teaching and learning (Mouza & Lavigne, 2013). This term is used interchangeably with "new technologies" throughout the study.

Major Emerging Technologies: The term refers to technologies that are quite well known and common, and still extensively investigated for their affordances in language pedagogy. It specifically refers to three technologies in this research: social networking sites (SNSs), mobile learning or mobile devices (ML or MDs), and digital games (DGs).

Minor/Other Emerging Technologies: The term refers to technologies that are not very well known and common, and yet to be investigated for their potential in language pedagogy. It specifically refers to six different technologies in this research: augmented reality (AR), virtual

assistants (VAs), wearable technologies (WTs), 3D printing, online language learning platforms (OLLPs), and massively open online courses (MOOCs).

User Intention Theories: The term refers to the theories developed initially in the area of social psychology in effort to predict one's intention or actual behavior to adopt a specific technology or innovation based several distinct but interrelated belief structures.

1.7 Organization of the Dissertation

This dissertation consists of five chapters. The present chapter begins with a background that frames the study and the reasons for this research, followed by the purpose of the study and accompanying research questions. The chapter concludes with the significance of this research and the organization of the dissertation.

Chapter Two begins with a brief introduction and an overview of technology and language pedagogy. The chapter, first, presents a brief theoretical and historical perspective regarding Computer Assisted Language Learning, the schools of thoughts for learning and theories of second/foreign language pedagogy. Then, the chapter introduces several major and minor digital tools that are considered emerging and new technologies, and it discusses general pedagogical values and worth of these emerging technologies in second and foreign language pedagogy. Next, the chapter also reviews language learners' perceptions of technologies based on respectively attitudinal, societal (subjective norms), and perceived control factors that might have a direct influence on their intentions or decisions to use a specific technology. Chapter Two ends with a review of theories guiding the theoretical frameworks utilized in this study by elaborating diffusion of innovation and user intention theories with a focus on their implications in education and language pedagogy.

Chapter Three describes the research methodology that was employed, and describes the principles and procedures of the methods that were implemented in this study. After providing an overview of the study by focusing on why the research topic has been chosen, the chapter introduces the research questions with brief information regarding their scope. It also describes the theoretical frameworks utilized in this study by mentioning additions and adaptations justified in accordance with research in the literature. The chapter, then, describes the setting and elaborates on the sample, which is followed by the depiction of data collection instruments. Finally, a detailed discussion of the methods and procedures employed for data collection and data analysis follows.

Chapter Four presents a review of the research results. The chapter begins with the presentation of the demographics of the participants and their overall use of technologies in general. Then, the chapter reviews the research results based on each research question, first, in terms of quantitative data, and then qualitative data. The chapter ends with a brief summary of overall research results.

Chapter Five begins with the discussion of the findings on EFL learners' approach to emerging technologies in general and their adoption of these technologies in language pedagogy. The chapter explains the meaning of the findings and integrates the results of the study with the literature in addition to pedagogical implications of the findings. The chapter also notes the limitations of the study, and ends with conclusions and recommendations for further research.

CHAPTER TWO:

REVIEW OF THE LITERATURE

2.1. Overview of the Chapter

This dissertation explores language learners' approach to technologies in general, first, by investigating learners' attitude toward most recent emerging technologies with a focus on their familiarity, actual use, intentions and perceptions about the technologies, and, second, by analyzing the factors that best predict language learners' intentions and decisions to use emerging technologies. The study specifically focuses on social networking, mobile learning, and digital games as major emerging technologies of today with also a focus on other emerging technologies such as augmented reality, wearable technologies, virtual assistants, massive online open courses, 3D printing and online language learning platforms. The literature review in this chapter will be presented in sequence on the following topics: (1.a.) A brief theoretical and historical perspective regarding Computer Assisted Language Learning (CALL), the schools of thoughts for learning and theories of second/foreign language pedagogy, (1.b.) Major and minor digital tools that are considered emerging and new technologies, and their general pedagogical values and worth in second/foreign language pedagogy, (2) learners' perceptions based on respectively attitudinal, societal (subjective norms), and perceived control factors that might have a direct effect on their decision to use a certain digital tool, (3) diffusion of innovation and user intention theories with a focus on their implications in education and language pedagogy.

2.2. CALL in Context and the Use of Emerging Technologies in Language Pedagogy

Computers have been used for language teaching since the 1960s (Warschauer & Healey, 1998), and several recent studies suggest that there is still a strong need to experiment with technology and digital tools in both education and language learning (Godwin-Jones, 2012; Goertler, 2009; Levy, 2009; Reinhardt & Ryu, 2013; Zhao, 2003). Because of the speed of technology, there have been drastic changes in every field in which technology is used as a medium. Each time that a society has developed a new medium for the transmission of knowledge, there have been profound consequences for language and language pedagogy (Wright, 2006). In fact, Rankin (2010) admits that the information shift is as drastic as the move from handwritten texts to books from the printing press (as cited in Fargo, 2012). Fargo further points out that information and knowledge are no longer held by the few in select repositories waiting to be disseminated to the masses by a master teacher. Information, both accurate and inaccurate, is free and available for use instantly over the Internet. Due to this and several other innovations and renovations in also educational methods, there is a strong need to elaborate on educational technology tools grounded within a historical framework and reflect on both constraints and affordances of new technologies. Therefore, this section first draws a map of the current state of computer-assisted language learning (CALL) within an existing theoretical and historical view of how technology has been used in education and language pedagogy. Afterwards, the rest of the section specifically focuses on certain major and minor digital tools that are considered emerging and new technologies, and on their general pedagogical values and worth in second/foreign language pedagogy. While those constraints and affordances are analyzed based on the current literature, the current section also presents some projections related to the future use of these technologies.

2.2.1. CALL in Context: A Brief Historical and Theoretical Perspective

As briefly noted by Warschauer and Healey (1998), computers have been around and in use for education and language pedagogy since 1960s. For over forty years up until today, there have been several different categorizations to explain how technologies have been used in language teaching and how they have been influenced by or have influenced other Second Language Acquisition (SLA) or educational theories. Some researchers like Levy (1997) focused selectively on computer assisted language learning (CALL) based on time periods in the decades from 1960s to 1990s. In fact, this idea seems practical since every decade from 1960s has its own identifiable characteristics. On the other hand, Warschauer and Healey (1998) divided 30+ years of history from 1960s to 1990s into three phases: behavioristic CALL, communicative CALL, and integrative CALL. In their article, they write, "each stage corresponds to a certain level of technology as well as certain pedagogical approach" (p. 57). Finally, it is also possible to situate the pedagogical use of technology within the framework of different schools of learning. Ally (2008) historically lists different schools of thought on learning starting with behavioristic approach, and then continuing with cognitive psychology and constructivism, and he finally explains a recently proposed theory, connectivism. Considering all these categorizations, regardless of whether they are based on time, theorists or different schools of thought, what is obvious is the fact that CALL has extensively benefitted from different schools of learning and developed based on certain technological inventions or innovations achieved in every decade since the first use of computers in language pedagogy. Even today, it is possible to observe how language teaching is fed by certain pedagogical approaches in spite of frequently emerging technologies. The discipline has of course come a long way since then, with a combination of education theory and technology being the two interrelated primary drivers of change (Jarvis &

Achilleos, 2013). Based on this background information, these CALL approaches will be explained further in light of each decade of digital innovations and certain schools of learning.

2.2.1.1. Behavioristic CALL

First of all, the behaviorist school of thought, influenced by Thorndike (1913), Pavlov (1927), and Skinner (1974), postulates that learning is a change in observable behavior caused by external stimuli in the environment. Behavioristic CALL, conceived in the 1950s and implemented in the 1960s and 1970s is informed by the behaviorist learning model, and this mode of CALL featured repetitive language drills, referred to as drill-and-practice (or, pejoratively, as "drill-and-kill") (Warschauer & Healey, 1998). Levy (1997), referring to this time frame, thinks that empiricist theory was predominant in language teaching which is described by Stern (1983) as "pedagogically audiolingualism, psychologically behaviorism, linguistically structuralism".

2.2.1.2. Communicative CALL

The next stage, communicative CALL, emerged in the late 1970s and early 1980s, at the same time when behavioristic approaches to language teaching were being rejected at both the theoretical and pedagogical level, and when new personal computers were creating greater possibilities for individual work (Warschauer & Healey, 1998). Warschauer and Healey further state that communicative CALL corresponded to cognitive theories, which stressed that learning was a process of discovery, expression and development. Cognitive theorists see learning as an internal process, and contend that the amount learned depends on the processing capacity of the learner, the amount of effort expended during the learning process, and the depth of the processing (Ally, 2008). As a result, instead of the set of optimal prescriptions for language teaching that was used in the 1950s and 1960s, views became more circumspect reflecting the

complexity of language teaching and learning, the attributes and needs of the individual learner (Levy, 1997). Levy (1997) continues by stating that notably new methods began to appear during this period and these rather humanistic methods and techniques engaged the whole person, their emotions and the affective dimension. To illustrate, a few of these methods were Community Language Learning, Total Physical Response and later on, as a far-reaching approach of the time, Communicative Language Teaching. What is really peculiar is that few of these approaches or methods put a deliberate emphasis on teaching with technology during this period although, as stated by Levy (1997), personal computers such as the Apple II and then Microsoft PCs were introduced then. The most obvious reason for this must be the constraints like accessibility and affordability of these machines, which is still an issue even today for emerging technologies. Regarding what was aimed with computers during this CALL phase, the focus was not so much on what students did with the machine, but rather what they did or were doing with each other while working at the computer (Warschauer & Healey, 1998).

2.2.1.3. Integrative CALL

Although the early 1980s saw a boom in CALL largely due to the introduction and widespread availability of inexpensive microcomputers, language teacher programmers, and word processing on microcomputers (Levy, 1997) by the later 1980s and early 1990s, critics pointed out that the computer was still being used in an ad hoc and disconnected fashion (Warschauer & Healey, 1998). Hence, there has been a move towards constructivist theory claiming that learners interpret the information and the world according to their personal reality, that they learn by observation, processing, and interpretation, and then personalize the information into personal knowledge (Ally, 2008). Afterwards, task-based, project-based, and content-based approaches all sought to integrate learners in authentic environments, and also to

integrate various skills of language learning and use, which led to a new perspective on technology and language learning, integrative CALL (Warschauer & Healey, 1998).

2.2.1.4. Critiques of Three Phases of CALL

Regarding the above-mentioned three phases of CALL famously identified by Warschauer and Healey (1998), Bax (2003) presents several criticisms against them, and has come up with three new categories named as 'restricted, open, and integrated CALL'. Bax claims that Warschauer and Healey's phases are inconsistent in that the nomenclature is misleading since neither behavioristic CALL nor communicative CALL is in accordance with the pillars and boundaries of respectively behavioristic school of learning and communicative language teaching. Moreover, he underlines the need for re-evaluating the phases in their dating in addition to nomenclature. Based on the revision by Bax (2003), restricted CALL is preferred as an approach rather than a phase, but it is still similar to Warschauer and Healey's behavioristic CALL with the exception of the term itself. Bax's second approach, open CALL, seems to have lasted from the 1980s until early 21st century unlike Warschauer and Healey's communicative CALL. Open CALL approach refers to an era in which it is relatively open in all dimensions- from feedback given to students, to the software types, to the role of the teacher (Bax, 2003). The key characteristic of this approach is the availability of Web and more democratization regarding the use of computers and technology. Unlike, Warschauer and Healey (1998), Bax insists that integrated CALL did not yet exist during early 2000s when the article was written (2003). This is quite understandable when it is thought that integrated CALL or integrative CALL requires a thorough integration of computers and technology in education and even further a "normalization" period, which, in Bax's terms (2003), refers to "the stage when a technology is invisible, hardly even recognized as a technology, taken for granted in everyday life" (p. 23).

What is worth mentioning here is the fact that the discussion itself and the attempt to understand what CALL has been and currently is absolutely significant to develop a fully appropriate role for computers in language teaching and learning. Moreover, as Bax (2003) argues, assuming that in general terms we are in an integrated phase of CALL, it is possible that each institution and classroom may also exhibit certain open and even restricted CALL features.

2.2.1.5. Current State of CALL and Educational Technology

Currently, there is also a recently proposed theory under discussion (Downes, 2006; Siemens, 2004) which is termed as "connectivism" and it is the integration of principles explored by chaos, network, complexity and self-organization theories. Based on connectivism which is in the beginning of its development, changing environments, innovations, changes in the discipline and in related disciplines all suggest that learners have to unlearn what they have learned in the past, and learn how to learn and evaluate new information.

In light of the information provided so far in this section, it is obvious that there have been drastic changes since the earliest times of CALL to the present day. These changes have occurred in several diverse but complementary areas; from teachers to learners, needs to aims, media to content, materials to learning environment, implementation to assessment and etc. Taking into account all these, there are a few notable things to underline regarding educational technology, CALL and schools of learning with also a focus on learners and teachers:

1. According to Ertmer and Newby (1993), the three schools of thought can, in fact, be used as a taxonomy for learning. Behaviorists' strategies can be used to teach the *what* (facts); cognitive strategies can be used to teach the *how* (processes and principles); and constructivist strategies can be used to teach the *why* (higher-level thinking that promotes personal meaning, and situated and contextual learning),

2. Strategic use of new educational technologies can enhance learning and teaching. However, to be effective, new educational technologies need to be supported by innovative pedagogical approaches which in turn enable collaboration, communication and mobility (Webster & Murphy, 2008)

3. The teacher has become a facilitator of learning rather than the font of wisdom, and will find, select, and offer information in a variety of ways on the basis of what the students must learn in order to meet diverse needs (Warschauer & Healey, 1998),

4. Amidst all this change, issues such as the roles of computers in CALL, other more recent digital tools, optimal approaches to authoring, effects of the technology on the methodology, integration, and evaluation remain central issues, as they have over the last thirty years (Levy, 1997).

5. The era of limited access to desktop computers with a few basic mechanical "drill and kill" software programs is long gone in many contexts. CALL has grown to include online blogs, use of apps, virtual learning environments, computer-mediated communication, among others (Jarvis & Achilleos, 2013)

6. Although it is difficult to prove Prensky's claim (2001) that today's language learners, as "digital natives", "millennials", "generation M" or "net generation", are completely different from previous generations of 'immigrants', it is true that our students have changed radically, too. Students can easily retrieve information now (Fargo, 2012). Memorization is less important in this information-rich time (Warschauer & Healey, 1998) in which the "Google effect on memory" is researched (Sparrow et al., 2011). Therefore with all the need to integrate technology meaningfully into language pedagogy, it should also be remembered that good teaching also aims to improve students' ability to engage in higher-order thinking; it recognizes

the diversity of learners' abilities and needs; and it reflects an awareness of both the complexity of the learning process and the need to make adjustments in different circumstances (VanSlyke, 2003). They also need both the technology know-how and the awareness of their own language learning styles/aptitudes to function fully in a multicultural, multilingual world (Godwin-Jones, 2012).

2.2.2. Emerging Technologies in Language Pedagogy

Along with the rapid development of information and communication technologies, educators are trying to keep up with the dramatic changes in our electronic environment (Han, 2012). Advances in technology have revolutionized the way in which language learners learn, play, communicate, and socialize. As Ito (2008) illustrates, technological gadgets, mobile phones, and participation in social network sites are now fixtures of youth culture. Fargo (2012) observes that the average middle school student has direct access to the information on a daily basis and interacts with others around the world using interactive video games, social media, and mobile technology. In fact, Halverson and Smith (2010) have identified two types of digital technologies: (1) technologies for learning, generic tools that define learning goals, develop structures to guide students, and provide measures of learning outcomes regardless of motivation or the ability of individual learners; (2) technologies for learners, tools emphasizing student agency by allowing users to select their own learning goals and the means that will help them achieve those goals. Mouza and Lavigne (2013) define that both these technologies are collectively referred as *emerging technologies,* and the term emerging is used to encompass both technologies whose integration in classroom settings is now being investigated as well as technologies whose integration has been researched but not exhaustively. In all instances, the focus is on technologies that are viewed as having the capacity to significantly influence the

processes and outcomes of teaching and learning (Mouza & Lavigne, 2013). The term *"emerging*" or "*new technologies*" has been used extensively since the earlier times of CALL to refer to different things: the use of text messages in language teaching, early simulation games based on language exercises, hyperlinks, CD-ROMs, early forms of social networking sites (SNSs), emails, and more recently Web 2.0 tools such as blogs, wikis, instant messaging, video chat, social bookmarking and etc. Today, the New Media Consortium, or NMC, is a professional organization of educators dedicated to the study and implication of technology in the classroom. NMC publishes an internationally recognized report every year titled as the NMC Horizon Report which is part of the NMC Horizon Project, a comprehensive research venture established in 2002 that identifies and describes emerging technologies likely to have a large impact over the coming five years in education around the globe (Johnson et al., 2016). Based on the most current and previous reports, there are certain emerging technologies that might have a very large impact on language pedagogy as technologies both for learning and learners. These technologies could create effective learning environments that support student agency and serve as a bridge between learning in school and out-of-school settings (Mouza & Lavigne, 2013), and they provide users with new opportunities for interconnectivity, social interaction, and expanded online communities of practice (Blasing, 2010). However, since there is not enough proof based on current research and since they have not been investigated exhaustively, these technologies fall under emerging technologies and will be investigated further in the rest of this section. Anusha and Rama (2014) express that the emerging of applications is like a double edged sword having its own pros and cons; however, it is we who need to take a right decision and use the applications in an optimum way. Therefore, in order to serve to this purpose, this section analyzes three emerging technologies (SNSs, digital games, mobile learning) in language

pedagogy with a comprehensive focus on their affordances and constraints. Toward the end of the section, a further brief discussion is presented related to other certain emerging technologies which are augmented reality, 3D printing, virtual assistants, wearable technologies, online language learning platforms, and massively open online courses (MOOCs).

2.2.2.1. Social Networking Sites (SNSs)

Research varies as to when the first officially recognized social network member site was launched. Some research suggests that Friendster.com and sixdegrees.com, both launched in 1997, were two of the first social networks (Gibson, 2009). In 2016, it is estimated that there will be around 2.13 billion (2.44 billion in 2018) social network users around the globe, up from 1.47 billion in 2012 (Statista, 2016). Facebook, currently the leading SNS, has 1.59 billion monthly active users based on the latest report published on the website itself with the majority being mobile users (1.44 billion), and this number was only sixty thousand back in 2009, and about 900 million in 2012. It is also quite astounding that 1.04 billion SNS users visit Facebook on a daily basis (Facebook, 2015). Recognizing this, applied linguists and educators in general have been exploring the potentials SNSs hold for second and foreign language teaching and learning (McBride, 2009; Reinhard & Ryu, 2013; Reinhardt & Zander, 2011). Boyd and Ellison (2007) define SNs as web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system. From a theoretical standpoint, although early forms of SNSs could provide features such as instant messaging and synchronous communication, they were rather mechanical and could not provide advanced features as they do today. Currently, one can observe the influence of socio-constructivist theory which emphasizes the importance of learner identity formed in

relation with others within an authentic setting, which displays itself as group pages, #hashtags, affinity groups, specialized SNSs and etc. Furthermore, through the mirrors of connectivism, SNSs can be seen as chaotic networks where individuals must be equipped with digital literacies and critical thinking skills by also unlearning what they have previously knew. From a post-structural view, SNSs can be seen as Web 2.0 artifacts that embody socio-literacy practices (Reinhardt & Ryu, 2013).

Perhaps, the most exciting aspect of the Web is its potential to bring us into contact with a wide range of other people celebrating the idea of a 'community' in a quite democratic environment (O'Donoghue, 2000). Likewise, today, as a result of growing ubiquity of SNSs such as Facebook, Twitter, Pinterest, Flickr, YouTube, Tumblr, Instagram and many others, and their potential for two-way dialogues between students, prospective students, educators and others, understanding how social media can be leveraged for social learning is a key skill for teachers (Johnson et al., 2014). Especially for language teachers, these SNSs offer invaluable opportunities such as fostering intercultural communicative competence, authentic language settings, and real-life-like speaking in a foreign language, which are really vital in language pedagogy and rare to achieve in traditional language classrooms in which technology is not used. On the other hand, as stated before by Anusha and Rama (2014), emerging technologies such as SNSs are like a double-edged sword and possible threats and weaknesses should also be considered.

Firstly, Reinhardt and Zander (2011) note that since Facebook is available in 70+ languages, and a majority of its users are outside the US, applied linguists and L2 educators have noted that SNSs hold great potential for L2 pedagogy (e.g., Gibson, 2009; McBride, 2009; Reinhardt & Ryu, 2013; Stevenson & Liu, 2010). Moreover, the fact that SNS use is an authentic

and real-life-like practice for millions of people warrants its inclusion in L2 curricula (McBride, 2009; Thorne & Reinhardt, 2008). All these opportunities are really promising for education and language pedagogy; however, it is also a fact that most FL (Foreign Languages) teachers have limited freedom over their curricula and institutional restraints often make integrating SNSs into teaching plan difficult indeed (McBride, 2009). More importantly, although today's learners are the "net generation" born into technology, they actually lack pragmatic knowledge and critical thinking skills for interacting on SNSs especially in a foreign language. Furthermore, regarding the plurilingualist nature of SNSs where one can find enough input in many languages, it is also a fact that a single piece of communication occurs in several languages at the same time in a code-switched way. This also becomes a challenge for educators to warrant learners' access to authentic communication in one single L2.

Secondly, several researchers (Tufekci, 2008; Vie, 2007) noted that SNSs are also increasingly popular and induce some of their users a sense of "flow", and, as Egbert (2005) states, the experience of losing track of time as a result of being fully engaged in an activity. Regarding current numbers and facts, SNSs really motivate learners to spend time on social media out of their classrooms in an actually autonomous, and entertaining way. Godwin-Jones (2008), Winke and Goertler (2008) suggest we incorporate SNS usage into our class-related activities to capture our learners' imaginations and fit their thought patterns and socializing habits. Nonetheless, it is also a fact that most learners might not see SNSs as educators aim to help them see. To illustrate, Reinhardt and Zander (2011) point out that they noted resistance from some students who think SNSs activities are out of context for them since they focused more on TOEFL and these students were with a more traditional, utilitarian orientation towards learning English. One Chinese student in the study commented to the instructor that the

Facebook activities were the most useless thing he ever had to do in class since he thought he did not learn anything (Reinhardt & Zander, 2011). Therefore, either due to the fact that some students are really traditional and utilitarian, or since they consider SNSs as originally entertainment tools but not instructional tools, educators might face resistance from them. For instance, Goertler (2009) explains that students have not been so interested in using SNSs directly in the language classroom based on her experience, but they do make frequent use of SNSs to communicate with other class-related issues such as worksheets and assignments. Similarly, Stevenson and Liu (2010) have found that there is a great user interest in traditional Web 1.0 learning technology rather than language learning tools integrating SN features when it comes to language learning. Nevertheless, since most research studies demonstrate that SNSs really motivate students because it is a huge part of their lives, these challenges could be dealt with through careful planning and implementation by educators.

Finally, since SNSs run in a very integrated way with all other tools and websites, users can do many activities there and portray their identity while at the same time learning about others. To illustrate, McBride (2009) proposes that users can take online surveys made for SNSs and post their answers or other things on their pages. Thus, they can learn a great deal about their friends without ever communicating directly with them or even going to their profile pages. However, if this is directly brought to class and used as a classroom activity, say during the first week of classes while introducing each other, it might cause problems such as making fun of friends, or later on even “cyber-bullying”. It is also questionable how those surveys display the true self of a person with quality and accuracy. Furthermore, as another side of the coin, teachers feel their authority decreases if students view their personal information on an SNS (McBride, 2009). All in all, it is a fact that SNSs offer several authentic experiences for learners and

teachers in language pedagogy, it is also obvious that it requires a very careful planning and implementation in order not to blemish the inherent characteristics of SNSs.

2.2.2.2. Mobile Learning (ML)

In 2013, Language Learning and Technology Journal allocated the whole issue to mobile learning, and Ushioda (2013), in her commentary, points out that learning with mobile technologies is currently a rapidly developing area of interest for researchers, teachers, materials writers and app developers in the educational field, not least within language classroom. Based on the NMC Horizon Report (Johnson et al., 2011), studies show that by 2015, 80% of the people accessing the Internet will be doing so from mobile devices, and statistics published by Facebook for its stakeholders already show that percentage is even higher and 90% of the monthly active Facebook users access the site on their mobile devices (Facebook, 2015). The report continues by predicting that Internet-capable mobile devices will outnumber computers by next year, which is an important change for education. The change is so rapid that it also causes conceptual ambiguities. Mobile learning, or m-learning, is a sub-division of the e-learning movement, further evidenced by European initiatives such as m-learning and mobilearn (Chinnery, 2006). Yang (2013) expresses that as mobile computing technologies have been more powerful and inclusive in people's daily life, the issue of mobile assisted language learning (MALL) has also been widely explored in CALL research. On the other hand, due to the ubiquitous nature and unprecedented evolution of these devices, Jarvis and Achilleos (2013) argue that there is a need to move from CALL towards a more accurate acronym: mobile assisted language use (MALU) defined as non-native speakers using of a variety of mobile devices in order to access and/or communicate information on an anywhere/anytime-basis and for a range of social and/or academic purposes in an L2. Although they claim in their article that such a

definition encompasses all the features of CALL and even MALL, this study will stick with MALL or m-learning to refer to the use of any mobile and portable devices in language pedagogy.

Many researchers on MALL consider the emerging mobile technologies have considerable potentials for the effective language learning (Yang, 2013). With increased screen real estate, battery life, and input options, these new mobile devices have rapidly become a viable alternative to heavier, less affordable laptop computers (Johnson et al., 2011). Although there are studies in which some students, depending on their age, prefer to use devices such as laptop computers with larger screens for their assignments and projects, most studies suggest that autonomy, flexibility, freedom and choice are intrinsic features of mobile learning, and by exploiting these features teachers and materials designers may well be able to promote internalized motivation for independent learning (Chinnery, 2006; Jarvis & Achilleos, 2013; Kukulska-Hulme, 2009; Ushioda, 2013). Van't Hooft (2013) lists affordances made possible by mobile devices as (1) high mobility, (2) size and unobtrusiveness, (3) accessibility and affordability, (4) adaptability, (5) capabilities to create, collect, access, and display information in multiple modalities, and (6) the ability to support communication, collaboration, and sharing. Mobility per se offers a lot of affordances in terms of language use. Burston (2013), in his comprehensive work of bibliography of MALL publications from 1994 to 2012, observes that, in a very broad sense, for as long as formal instruction has existed there has been an interest in freeing learning from the constraints of time and place. Thanks to the high mobility feature and enhanced location based characteristics, mobile learning can take learning out of the classroom. More importantly, apps or other emerging technology capabilities such as augmented reality, quick response (QR) codes add new layers or give an additional dimension to existing

environment that might also be manipulated and adapted by language teachers. All these features are really intriguing and even groundbreaking for teaching languages in more authentic settings to more autonomous learners; however, there are also constraints paralleling them. First of all, the ability to track mobile devices and position them on the globe raises the privacy issue for students as well as regular users. Another issue is again related to how curriculum is fixed and does not tolerate this size of flexibility at most institutions. Finally, a successful and efficient integration of mobile learning into language pedagogy by even manipulating this technology as in the case of augmented reality or QR codes requires ongoing professional development in technical, curricular, and pedagogical areas (van't Hooft, 2013). On the other hand, van't Hooft (2013) states that compared to other areas, mobile learning research is still in its infancy, especially with regard to determining its impact on teaching and learning. The NMC Horizon Report (Johnson et al., 2011) underlines that the potential of mobile computing is already being demonstrated in hundreds of projects at higher education institutions, while it is also a fact that more research is needed to prove its effectiveness over rather traditional but more established teaching methods especially in language pedagogy. To serve to this end, Kukulska-Hulme (2009) suggests that innovative practices in the use of learning technology drawn from science, geography, art or history, can be examined for their potential relevance to the development of new practices in language learning.

2.2.2.3. Digital Games (DGs)

Based on the last four years' NMC Horizon Reports, games, gamification and game-based learning have been among the technologies that are likely to have a large impact on teaching and learning in higher education. What is worth mentioning is the fact they have always been predicted to be among the technologies to be adopted massively in pedagogy in two to three

years' period. One possible explanation for this might be the fact that these reports are based on experts' opinions and predictions implying that they might not necessarily come true, but on the other hand, it is true that digital games and gamification have developed into an area so broad that new narrative forms and distinct game genres have emerged, merged, and re-emerged as new forms (Reinhardt & Sykes, 2012). In fact, digital games date back to early period of microcomputers in which drills were popular emerging genre (Warschauer & Healey, 1998), and today they are even more common, and it is rather a common exercise for learners to lose track of time with examples such as multiplayer gaming (Levy, 2009), and even massively multiplayer online games (MMOGs) (Reinhardt & Sykes, 2012). According to Robert Torres (2011) of the Bill and Melinda Gates Foundation, 97% of Americans between the ages of 8 and 18 play video games (as cited in Fargo, 2012). The visual impact created by video games is the reason for its extensive followers (Anusha & Rama, 2014). Torres (2011) posited that video games are so important to students because they offer a sense of relevance and context, are active, provide social interaction, and offer emotional engagement (as cited in Fargo, 2012). Many games require cooperation with other peers and facilitate problem-solving skills with real-life applications; therefore, today many educational concepts find their way to students through games, and many concepts in pedagogy are in the form of games like: puzzles and problem solving (Anusha & Rama, 2014).

Many researchers find useful insights in the research from games studies (e.g., Arnseth, 2006; Juul 2005) and educational gaming (e.g., deFreitas, 2006; Gee, 2007), which have developed and adapted a variety of frameworks to research digital gaming, both in- and outside of educational contexts. Although gaming and gameplay have not been projected on in the latest NMC Horizon Report, in the report published in 2014 (Johnson et al., 2014), it is revealed that

educational gameplay has proven to foster engagement in critical thinking, creative problem-solving, and teamwork—skills that lead to solutions for complex social and environmental dilemmas. Kaplan University, for example, gamified their IT degree program after running a successful pilot in their Fundamentals of Programming course, and students' grades improved 9% and the number of students who failed the course decreased by 16% (Johnson et al., 2014).

In language pedagogy, Healey (2002) states that the variety and playfulness of language games improve the fun factor. In relation to online gaming, for example, Kuure (2011) suggests that activities around such games may provide important affordances for language learning, not as an objective as such, but as means of nurturing social relationships and participating in collaborative problem-solving and networking among peers. Making a distinction between the two following concepts, Reinhardt and Sykes (2012) express that they believe there is a place and necessity for both game-enhanced and game-based second/foreign language learning and pedagogy (L2LP) research and practice in the field. It is further explained that while vernacular games offer benefits for L2LP that might not be achieved by game-based L2LP environments, they do not offer all that is needed. Furthermore, the potential for L2LP-purposed games for targeted, curriculum-integrated instruction is enormous and the L2 learning game industry is booming (Reinhardt & Sykes, 2012). These points are really promising in terms of language pedagogy, but they raise several issues and constraints such as institutions' determinism in investing in games, teachers' both technical and pedagogic competencies in implementation besides their awareness of and familiarity with certain games, and finally students' participation into this process as enthusiastically as they do with other vernacular or learning games out of the classroom. Successful implementation and overcoming these issues could reveal the real

pedagogical values of games in L2LP, while failure in addressing the issues might result in disappointment and resentment from the learners.

2.2.2.4. Other Emerging Technologies

With the exception of MOOCs, there are also other relatively small-scale emerging technologies such as augmented reality (AR), 3D printing, wearable technologies (WTs), virtual assistants (VAs) and online language learning platforms (OLLPs), and all these technologies (will) have a considerable impact in the current and future practices of education. MOOCs, OLLPs and AR have already been around for the last few years, though not well established pedagogically and not researched enough. However, technologies such as 3D printing, VAs, and WTs are still in the development process, and not available to the public or in common use yet. The NMC Horizon Reports of last and this year categorize the latter group as the ones to have a large impact on teaching and learning in the next 4-5 years, while AR and MOOCs seem to be today's technology (Johnson et al., 2013; 2014).

In fact, it is true that AR especially integrated with QR codes has been studied in language pedagogy with really positive findings (Lavigne & Mouza 2013; van't Hooft, 2013; Yang, 2013), but it seems that they are not adopted to a considerable extent in language classrooms despite their great potentials. Yang (2013) describes that AR is highly integrated ML environment to improve learning outcome and experience by immersion. AR allows the user to see the real world with virtual objects superimposed upon or composited with the real world (Yang, 2013). Liu, Tan, and Chu (2010) demonstrated the effectiveness of such activities and they found out that AR allows participants to experience feelings and emotions as they do in the real world by interacting in a virtual environment.

MOOCs also seem to have had a large impact on teaching and learning and they have already been adopted by a massive number of people, but they can replace existing institutions or classrooms rather than being integrated into them. Some universities have already been working on creating their own MOOCs, and according to a summary of a recent Sloan Consortium 2012 Survey of Online Learning, "Only 2.6 percent of higher education institutions currently have a MOOC, another 9.4 percent report MOOCs are in the planning stages" (Stevens, 2013). Stevens (2013) reveals that the success of the connectivist MOOC model has been proof of concept that courses can be run for thousands of students at a time, and universities are jumping on the bandwagon in droves. Therefore, MOOCs seem to hold a great potential for especially the language learners who can manage to learn in chaos and adapt to online environments with ease. This kind of complex learning system might also provide flexibility, authenticity and autonomy better than what is offered within brick walls of regular classrooms.

OLLPs have been around and used actively by language learners at any age and language levels. DuoLingo, Busuu and Live Mocha are some of the most widely used platforms and examples for OLLPs. For instance, DuoLingo has been reported to have over 100 million registered users and offer language courses in more than 25 different languages. Despite OLLPs' long history, there is not substantial research on language learning platforms like DuoLingo or Busuu with some SNS features (Valencia, 2014). However, based on limited existing research, OLLPs seem quite effective for language learners. In an independent study by the City University of New York and the University of South Carolina, an average of 34 hours of Duolingo are equivalent to a full university semester of language education. Based on the findings of this study, a novice user of Spanish would need an average of 26 to 49 hours of study with Duolingo to cover the material for the first college semester of Spanish (Vesselinov &

Grego, 2012). In another study by Stevenson and Liu (2010) comparing three different OLLPs with SNS features, it was observed that Web 1.0 features attracted more attention and drew more interest by the participants of the study, and the users then were even discouraged by Web 2.0 and SNS features of OLLPs. Yet, it is evident that they were interested in those language learning platforms and used them effectively for their language learning process. Although issues such as lack of learner autonomy, the quality time spent on OLLPs and the variety of available language exercises might arise regarding OLLPs, they seem quite practical and effective considering 21st century EFL learners.

Although not as established as MOOCs, OLLPs and ARs, other emerging technologies such as 3D printing, WTs, and VAs can offer great learning potentials in the coming years. The NMC Horizon Report defines 3D printing as technologies that construct physical objects from three-dimensional digital content, and because of the inherent ability for users to create something, whether original or replicated, 3D printing is an especially appealing technology as applied to active and project-based learning in higher education (Johnson et al., 2014). Especially when it becomes available inexpensively to language classrooms, its potential to manipulate real-life objects, the use of realia or props, and students' creations for different projects and tasks all seem highly promising.

Secondly, the emergence of wearable devices such as Google Glass, wristbands, and smart watches is also promising in terms of language pedagogy in two ways. With all these devices come various features such as taking photos, video or voice recording, instant messaging (IM), and even haptic communication via the device. When all these devices become affordable and more accessible, they might even replace mobile devices and the same features that are possible with mobile devices today could easily be managed with WTs. The capabilities and the

convenience that WTs could offer to privileged learners are even more assuring for this type of emerging technologies in language pedagogy. Moreover, in spite of privacy concerns, WTs can also automatically track users and collect data about their daily life, eating habits, activities and etc. This kind of data can become useful in educational planning such as needs analysis, but more importantly, this data can also offer authentic, personalized, and real-life classroom content that can be used for further speaking, writing or similar language activities.

Finally, voice recognition and gesture-based technologies have been existing for a long time on the consumer market, but virtual assistants, as an extension of natural user interfaces, allow users to participate in life-like conversations (e.g., Apple's Siri, S-voice, Amazon's Echo). Recent capabilities of Siri are decoding and displaying words as users speak, which offers many benefits for improving speaking, pronunciation, and spelling skills. Based on the NMC Horizon Report, VAs are four to five years away from being widely used in higher education, but it is also true that students are already using virtual assistants in their personal lives. However, most institutions have yet to explore this technology's potential outside research settings.

All in all regarding all these other emerging technologies detailed in this section, they surely hold invaluable benefits and capabilities in education and language pedagogy. Although predictions might differ, it seems that there is still time to make these technologies widely adopted in academic settings and practically in classrooms. It is also true that these devices have their own constraints similar to other large-scale emerging technologies such as affordability, accessibility, teacher training, learner training and familiarity, and etc. There is also a lack research on the pedagogical and technical usability of these technologies and how potential language learners could use these tools to enhance their own language learning abilities. Thus, in order to prove their effectiveness and to find out whether they should be preferred over other

established and even traditional tools especially in language pedagogy, what is needed is more research and studies to reflect opinions and experience of learners, educators, and other relevant stakeholders involved. Only when these have been achieved, these emerging technologies could reveal their inherent capabilities and affordances in education and language pedagogy.

2.3. English as a Foreign Language (EFL) Learners' Perspectives of Emerging Technologies

New technologies provide more tools than ever for language learners to hone their language skills through autonomous reading, listening, writing, and interaction (Warschauer & Liaw, 2011). Moreover, students today are known as "digital natives" (Prensky, 2007) or the "net generation" (Oblinger, 2003); in other words, students now have used computers and the Internet all their lives, and this is the generation teachers face today (Bayne & Ross, 2007). Prensky (2001a) claims even further by stating that today's students are no longer the people our educational system was designed to teach. It is also argued that digital natives' brains are likely to be *physically different* as a result of the digital input they received growing up (Prensky, 2001b), and so we need to reconsider our methodology and content and teach through games and all new digital tools (Prensky, 2001a). However, in spite of some distinct characteristics and claimed uniqueness of the new generation who are learning languages at tertiary level, I agree with VanSlyke (2001) who states that good teaching also aims to improve students' ability to engage in higher-order thinking; it recognizes the diversity of learners' abilities and needs; and it reflects an awareness of both the complexity of the learning process and the need to make adjustments in different circumstances. Based on how the concepts of digital native and digital divide have been overgeneralized, it is usually assumed that every piece of digital technology integrated into language pedagogy would certainly be welcomed by today's learners no matter

how meaningfully it is done. However, this does not necessarily reflect the truth all the time among researchers in education and language pedagogy. Regarding learners' perceptions toward new and emerging technologies being integrated into language pedagogy, studies mentioning emerging technologies such as social networking sites (SNSs) (Eren, 2012; LeNoue et al., 2011; Mitchell, 2012), mobile learning (ML) (Hsu, 2013; Jung, 2014; Kim et al., 2013), digital games (DGs) (Liu, 2014; Warschauer & Liaw, 2011), and teaching models with technology such as hybrid and flipped learning (FL) (Butt, 2014; Goertler, 2012; Long et al., 2014) reveal both positive and negative reactions from learners. Ehrman and colleagues (2003) classify learner differences in three separate areas: learning styles, learning strategies, and affective variables. In order to avoid overgeneralizing with today's learners, and to effectively use emerging technologies in language classrooms, there is a need to go beyond these learner differences and dissect them with a focus on learners' perceptions toward available emerging technologies. This section, therefore, elaborates on the factors that have an influence on (language) learners' decisions or intentions to use certain emerging technologies for learning a language. In light of the existing user intention theories (Hartshorne & Ajjan, 2009), which is a topic explored further in the next section of this chapter, this part focuses on learners' perceptions based on respectively attitudinal, societal (subjective norms), and perceived control factors that might have a direct effect on their decision to use a certain digital tool. The current section concludes by briefly suggesting some solutions to overcome potential challenges of learners in using emerging technologies in their language learning process.

2.3.1. Attitude

In this section, how students' attitude is shaped toward using emerging technologies is detailed. In fact, attitude, being a very elusive concept, is hard to define and it is used to refer to a

variety of things in different studies. Ajzen (1991) defines attitude as the extent to which the individual favors a particular behavior. Zimbardo and Ebbesen (1969) note that attitudes have generally been divided into three components: affect, cognition, and behavior. According to Liu (2009), students' attitudes toward technology consist of students' feelings toward (affective), their belief and factual knowledge of (cognitive), and their behavioral intentions and actions (behavioral) with respect to technologies. The operational definition of attitude toward emerging technologies in language learning in this study is a combination and adaptation of definitions by Liu (2009) and Ajzen (1991), which involves learners' beliefs, knowledge, liking, and the extent to which they favor a particular behavior. According to Aydin (2007), it is obvious that learner attitudes affect the learning process significantly. Although this is true to a great extent, unlike Liu's definition (2009), it does not necessarily mean that attitude is the same as one's intent for future use of technology.

The relation between attitude and the actual use of technologies is twofold. On one hand, as pointed out by Woodrow (1987), integrating technology into the educational curriculum has the potential to change the process of education drastically, and any successful change in educational practice necessitates the development of positive attitudes toward the new technology. This, on the other hand, motivates learners to use that technology in their future learning. At this point, Rogers (2003), who was a very well known figure in innovation diffusion studies, asserts that one of the major factors affecting individual's attitudes toward innovation is the attributes of the technology, which are respectively 1) relative advantage, 2) compatibility, 3) complexity, 4) trialability, and 5) observability. Generally speaking, based on all components influencing one's attitude, language learners today have a relatively positive attitude toward technologies. For instance, in a study by Li (2007), it has been observed that Canadian students

have a positive attitude towards learning with technologies, with 87% of students indicating they were “very positive” about it, and 18% highlighting “fun”, “flexibility” and “increased confidence” occurring as result of using technologies in their learning. In a US study by Roberts (2005), the ability to customize and personalize their learning with technologies was identified as important by college students. According to Moyle and her colleagues (2012), many students in these studies indicate that more complex use of technologies would improve their attitudes toward their learning. However, what is important at this point is that ease of use is another important factor having a direct impact on learners’ attitudes (Hartshorne & Ajjan, 2009), which means educators should train learners for complex use of technologies so that learners should not feel those technologies are hard to handle. According to Ayres (2002), the majority of language learners still find CALL easy to use (68%) and relevant to their needs (80%), which speaks well of the design of the CALL software interfaces in general.

Another significant component of attitude is usefulness. Davis (1989) defines perceived usefulness as the extent to which a user feels the technology would enhance his/her performance. Rogers (2003) refers to usefulness as relative advantages. As for language learners specifically, Chapelle (2003) thinks that surely with all of the material in English on the Internet, any learner can find sufficient comprehensible input for a kind of virtual immersion. For instance, some learners who systematically listen to podcasts enter a state of “flow” and temporarily forget that they are listening to a foreign language (McQuillan, 2006), which is very important for acquisition (Basaran & Cabaroglu, 2007). In another study by Kourieos and Evripidou (2013), the use of YouTube was perceived particularly beneficial and motivating by seven interviewees who emphasized its usefulness in helping them improve their language skills and increase their vocabulary. In such tasks, as Csikszenmihalyi (1991) describes it, students may experience

"flow", an in the moment, optimal sensation of enjoyment and competence. The same "flow" has also been observed in a global simulation study done by Dupuy (2006).

Warschauer (1996) identified three common factors of student motivation provided by technology enhanced setting: communication, empowerment, and learning. "Communication" is represented by the finding that students liked the ability to communicate with others and to engage in real, as opposed to contrived, communicative acts (Stepp-Greany, 2002). In a study based on SNSs, Facebook, by Mitchell (2002), six out of seven participating Facebook users reported learning English by communicating through the site, despite joining for other reasons. Moyle et al. (2012) underline the significance of communication by stating that it is a key motivator for students to use technologies. However, since usefulness is not the only component affecting attitude, teachers should not fall for the assumption that SNSs especially Facebook always work well in classes with all "digital native" language learners. Decuypere and Bruneel (2012) find that their study demonstrates students' drawing a sharp distinction between the ways they use Facebook, and why they do so. West et al. (2009) explain that Facebook as a tool is part of their private lives and consequently learners are not fond of the idea of letting educational matters slip into their Facebook activities. Eren's study (2012) reveals that students have a very positive attitude toward the use of Facebook activity as a supplement to language classroom, but traditional classroom based language learning still remains a backbone for language education.

Maher (1987) indicates that knowledge always has an emotional component, a feeling that comes from students' sense of purpose, sense of connection to the material and the particular context (as cited in Dupuy, 2006). Regarding this "emotional" aspect besides other components of attitude such as "fun", "enjoyment", and "flow", digital games (DGs) might be another emergent technology toward which language learners feel inclined. Prensky (2001b) underlines

the importance of games for digital natives, but puts further emphasis on their being meaningful and developed based on learners' needs, not just a "sugar coating" as some educators have referred to it. There is a great deal of evidence that children's learning games that are well designed do produce learning by and while engaging them (Prensky, 2001b). Waters (2007) found that carrying out tasks in the game and being exposed to both visual and auditory reinforcement in the process assisted players in developing vocabulary, but not necessarily grammar.

Another emerging technology toward which learners feel a highly positive attitude thanks to factors such as ease of use, perceived usefulness, emotional attachment, communication, relative advantage is mobile devices. Davis (1992) and Gordon and Anand (2005) claim that enjoyment from using mobile devices has a positive effect on users' attitudes through perceived usefulness. Hamilton (2012) proposes that communication through computer, or even more preferably mobile devices in our case, is motivating, modern, new, responsive to events in the classroom, helping to develop communication skills and more importantly helps maintain links between events in the classroom and home. Computer Mediated Communication (CMC) applications and communication through mobile devices, when appropriately designed for pedagogical goals, instructional context, content, and learners, can closely approximate authentic communications to the degree equivalent to real-life learner-to-learner or teacher-to-learner communication (Lin, 2014). Nevertheless, just like with Facebook, students use living technologies, for instance mobile phones and SNSs almost exclusively for leisure activities, and learning technologies almost exclusively for learning activities (Decuypere & Bruneel, 2012).

All in all, attitude is a really elusive term embracing several other factors such as ease of use, usefulness, relative advantage, compatibility, enjoyment, fun and so on. However, based on

the current literature and existing studies, it is obvious that attitude per se could be a strong determinant of why learners might wish to use certain emerging technologies such as SNSs, DGs, and mobile devices in their language learning process. Likewise, they might not show enthusiasm for these technologies based on their attitudinal beliefs. Therefore, without overgeneralizing all learners as digital natives, it is significant for educators and decision makers to dissect learners' perceptions based on their attitudes.

2.3.2. Subjective Norms

According to Ajzen (1991) subjective norms describe the social pressure individuals experience when performing a particular behavior. Depending on whether the focus of a study is learners or teachers, this pressure might come from peers, superiors or teachers, and colleagues. Since the focus of this study is language learners, social pressure from faculty and peers (other students) will be considered while analyzing how they might affect learners' perceptions toward the use of emerging technologies in language learning. Subjective norms might not be as effective as attitudes in predicting user intentions; however, they are still important for learners to use certain technologies. For instance, Chapelle (2003) observes that the students in the computer labs chose to be there because peers were there. She explains further by stating that those students may not have been interested in practicing their English except insofar as it lets them engage in activities that brought them out of their rooms into a place where peers were around. Livingstone and Bober's study (2005) reveals that the students noted however they learned about technologies away from school and parents, mainly from friends and through personal exploration. Murray (2000) suggests that participants in a specialized Netspeak register might usefully be thought of as a speech community, which she defines as "a group of people who share linguistic and non-linguistic interaction but whose norms may be evolving or may be

the site of struggle" (pp.399). In fact, regardless of the technologies used, even the language per se, in this case English, is used extensively for social purposes and for obtaining information, both personal and academic (Jarvis & Krashen, 2014). Therefore, the significance of peers and other friends on individual learners' intentions to use technologies, just like their intentions to use a foreign language, should not be underestimated.

Regarding specific emerging technologies focused on in this study, the use of SNSs could be a worthy example to prove subjective norms' significance on actual behaviors. In a study carried out by Mitchell (2012), the English for speakers of other languages (ESOL) students in the study joined Facebook for social reasons, and their use over a four-week period and interview data showed that they were able to communicate with existing friends, learn English, and learn about American culture through Facebook. Mitchell (2012) further illustrates that Facebook use can help students acclimate to college life, build American friendships and experiment with English. According to a meta-analysis by Lin (2014), having peers as interlocutors in CMC activities to learn languages generated a larger effect size compared with native speakers, followed by teachers that generated the smallest effect. This shows that peers could become really significant when it comes to using SNSs and communicating with other peers through technology especially in language learning. On the other hand, this might result in an opposite direction as well. Rogers (2003) indicates that system norm was an important predictor of diffusion of innovations. He defines "norms" as "the established behavior patterns for the members of a social system"; therefore, it is supposed that norms can also become barriers to the adoption of innovation, as the norms of a society or an organization usually tell people what they are expected to do in a given culture (Liu, 2009). Then, there is another possibility that peers might influence individual learners in a way that they might resist using certain emerging

technologies that might be encouraged by the institution and teachers. Therefore, for a teacher to successfully use technology in a language class, first it is imperative to have a high level of language proficiency as well as a certain level of technological literacy (Kourieos & Evripodou, 2013) in order to be able to avoid technical issues in the application of technologies and also to impress learners since they are also influential as part of learners' subjective norms. Besides, it is also significant that teachers be aware of the fact that peers have an even more considerable effect on individual learners, and that they might deal with classroom issues when students show a lack of motivation to use certain digital tools in language classes.

2.3.3. Perceived Behavioral Control

Perceived behavioral control, another determinant of behavioral intention according to Ajzen (1991), describes the control individuals feel over their behavior. Based on the study by Hartshorne and Ajjan (2009), perceived behavioral control is decomposed into two other factors: self efficacy (Bandura, 1982) and facilitating conditions (Ajzen, 1991).

Firstly, facilitating conditions describe the availability of the resources required to use the technology. Availability of time, monetary funds, and the technology aimed to be used in language learning all fall under this factor which have a direct effect on the learners' intentions to be able to use certain technologies in class. Practically, if students have no access to certain digital tools such as mobile devices, computers and the Internet due to various reasons like money, space or time, it is highly possible that any attempts to use technology in class will result in a failure. Goertler (2012) holds that the biggest challenge in applying technology and the biggest reason why language program directors do not implement technology-mediated course components are the lack of access to technology and issues about the reliability of such technologies. In speak-up surveys given by Moyle et al. (2012), students want access to up-to-

date technologies at school and for these technologies to be easily available. Kim and his colleagues (2013) carried out a study based on the use of mobile devices in language pedagogy, and they found that it is important to remember students may not have consistent access to mobile technologies including new mobile devices that are supposed to take learning outside the classrooms. They also underlined the possibility of limited access to mobile services due to their costs. Therefore, teachers and institutions need to take these factors into consideration before implementing technology in language classrooms.

Moreover, although Ehrman et al. (2003) list "self-efficacy" as affective factors, which mostly relate to attitude, Ajzen (1991) defines "self-efficacy" as the individual's comfort level using the technology based on Bandura's earlier definition. Bandura (1995) defined computer self-efficacy as the user's confidence in his or her knowledge and skills to successfully complete a specific task and suggested that such confidence has considerable influence on the user's satisfaction and perseverance in a wide range of activities. Based on this information, it seems relevant to consider "self-efficacy" as part of perceived behavioral control since, as Kim et al. state, as learners become more comfortable with using technology and change their receptivity to it, they can have more control on and see more value in adopting new technology in their classes. Salmon (2000) finds that students need to feel competent about how to use web-based instructional environments before they are comfortable with exchanging ideas and information (Zhu & Bu, 2009). That is, even if learners have enthusiasm for using technology in their learning process, lack of computer skills, access to technology, expertise, and other constraints due to time, space and money might deter learners from proceeding with technology.

2.3.4. Language Learners and Emerging Technologies

As repeatedly mentioned and observed throughout this section, language learners view new technologies as convenient, useful, flexible, ubiquitous, dynamic, interesting, enjoyable, fun, rewarding, meaningful, engaging and motivating especially in their language learning processes. Among the benefits provided by technology are increased motivation, improvement in self-concept and mastery of basic skills, more student-centered learning and engagement in the learning process, and more active processing resulting in higher-order thinking skills and better recall (Stepp-Greany, 2002). Learners are also encouraged by their peers and teachers to use technology, and they feel mostly competent and self-efficacious in using technology access to which is made possible thanks to investments and encouragement of institutions. However, the adoption of technology in the field of second-language learning is not without its limitations and should be examined keeping in mind the specific contexts in which the technology is adopted (Ware & Warschauer, 2006; Seror, 2012). The major issues are technical problems (Bidlake, 2009), privacy (Decuypere & Bruneel, 2012), low levels of proficiency and anxiety (Ehrman et al., 2003), lack of resources and availability (Kim et al., 2013), lack of training, addiction, and cultural dilemmas (Aydin, 2007; Hsu, 2013). In order to be able overcome these constraints, teachers first need to investigate their students' beliefs and perceptions so that they can be supportive, help them overcome their feelings of isolation and helplessness, and offer concrete suggestions for attaining both linguistic and digital literacy confidence (Basaran & Cabaroglu, 2014). In addition to being technically sufficient, teachers need to be aware of learner differences and more importantly factors encouraging or impeding them in using emerging technologies in language learning. Regarding each and every component under attitudes, subjective norms, and behavioral control, which are direct predictors of learners' intentions to use technologies,

teachers should be familiar with what causes or leads to the failure in integrating emerging technologies into language classrooms. Finally, for those who believe that "student centered" should be more than a slogan, it is necessary to understand the learner's perspective on what is – or is not - done to, for, and with him or her in the school setting… Computers, mobile phones, the Internet, social networking, games and other forms of digital media are a familiar part of the lives of students (Moyle et al., 2012), and there is a burgeoning need to know this target population and beyond by focusing on their behaviors, intentions and factors influencing them.

2.4. Innovations Literature and User Intention Theories

Technology has always been one of the central foci of second language acquisition (SLA) and there have been several different studies in which diverse research designs are applied to test the effectiveness and influence of technology on language pedagogy (Kim et al., 2013; Warschauer & Healey, 1998). Since the time when computers first started to be used in 1960s especially in language pedagogy (Warschauer & Healey, 1998), there have been also numerous studies focusing on the adoption of educational technology and the investigation of the individual acceptance behavior of information technology (IT) (Ajjan & Hartshorne, 2008; Cheon et al., 2012; Davis, 1989; Dugas, 2005; Rogers, 2003; Sadaf et al., 2012a; 2012b; Schoonenboom, 2014; Smarkola, 2008; Taylor & Todd, 1995). These studies and suggested models have shed light on user acceptance of new technologies in various areas from agriculture to higher education, but rarely in language pedagogy. SLA researchers have long studied perspectives, attitudes, and beliefs of both learners and teachers toward new technologies with diverse non/empirical research, but it is hard to pinpoint a robust theory or a model that has been used extensively in these studies. As stated by Lai (2013) in her study, which is among few studies that used and adapted a robust user intention model, what is missing is a

conceptualization of different motivating factors and potential interactions of these factors when predicting language learners' use of technology for learning. This lack of research and the need for a well-established model lead to difficulty in comparing the effectiveness of a certain technology under focus since it is hard to reach comparative effect sizes, power analysis and other statistical measures. However, when other educational areas in which technology is extensively integrated are considered, it is possible to name different behavioral intention theories which have been developed in social psychology as a way to explain or predict intention to perform a specific behavior (Paver, 2012). These distinct but related theories or models are innovation diffusion theory (IDT) (Rogers, 2003) and technology adopter categories (TACI) (Dugas, 2005), the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975), the technology acceptance model (TAM) (Davis, 1989), the theory of planned behavior (TPB) (Ajzen, 1991), and the decomposed theory of planned behavior (DTPB) (Taylor & Todd, 1995). This section first briefly describes these theories and explains how they are related to one another and also what makes them unique. Later, the section will focus on the implications in educational technology. Finally, based on the current user acceptance literature, the theories are discussed further regarding their limitations, and related suggestions are made.

2.4.1. The Innovation Diffusion Theory

Paver (2012) notes that a review of the development of user intention theories reveals that the similarities amongst these theories are greater than the difference; however, the distinctions between each theory are important. To begin with the diffusion of innovations (Rogers, 2003), Dugas (2005) states that a number of theories have been used to study the adoption of educational technology. Categorized as macro or micro, some theories focus on the reform and restricting of educational institutions, and are called macro-level systemic change theories

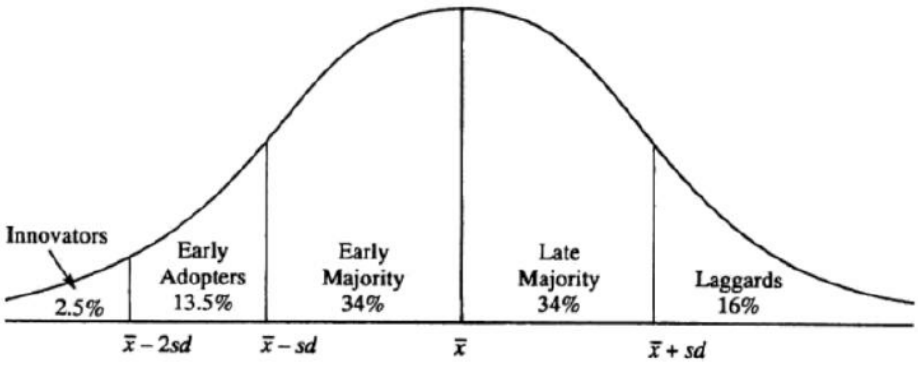
(Surry, 1997). On the other hand, a micro-level theory focuses on the adoption of specific educational technologies, and these theories, known as product utilization theories, concentrate on increasing the adoption of a specific educational technology by a specific set of potential adopters (Surry, 1997). Both systemic change theories and product utilization theories can be divided into two subcategories, representing the two predominant philosophies of diffusion of innovation in educational technology (Dugas, 2005). The determinist philosophy focuses on the developer of an educational technology, while the instrumentalist philosophy emphasizes the adopter of an educational technology (Dugas, 2005). What is noteworthy at this point is that instrumentalist theorists reject the assumption that well-designed technologies will automatically be adopted. Instead, Surry (1997) reports, they put emphasis on the human characteristics of individual adopters, believing that maximizing the diffusion of educational technology innovations is only possible by adopting more instrumentalist philosophy.

First of all, Rogers, in the fifth edition of his book, *Diffusion of Innovations* (2003), defines an innovation as an idea, practice, or object that is perceived as new by an individual or other unit of adoption. In the same book, diffusion is defined as the process by which an innovation is communicated through certain channels over time among the members of a social system (Rogers, 2003). The importance of emerging technologies such as social networking sites (SNSs), mobile learning (ML), digital games (DGs) and any other technology which are yet to be adopted in language pedagogy and named as “innovations” is obvious. However, for technologies to impact pedagogy, they must be accepted and used by both learners and teachers in institutions (Venkatesh et al., 2003). IDT dictates core constructs for innovations to be diffused as relative advantage, ease of use, image, visibility, compatibility, results demonstrability, and voluntariness of use (Venkatesh et al., 2003). Generally, innovations

perceived as having greater relative advantage, compatibility, trialability, observability, and less complexity will be adopted more rapidly than innovations without this mix of qualities (Dugas, 2005; Hall & Elliott, 2003). According to Dugas (2005), the innovation decision process (IDP) has five components, which are respectively knowledge, persuasion, decision, implementation, and confirmation. Based on Rogers' IDT, the diffusion process is well represented by an s-shaped curve and consists of five normally distributed groups of adopters: innovators, early adopters, early majority, late majority, and laggards (Hall & Elliott, 2003) (see Figure 2.1). Rogers' classification of adopters has been adapted to support studies in many areas, and Geoghegan (1994) provides a good description of the adopter categories as used to describe the adoption of educational technology, which is named as TACI. Each adopter category consists of individuals with a similar degree of innovativeness. Thus, the adopter categories are a means of convenience in describing the members of a system (Dugas, 2005).

Figure 2.1

Adopter Categorization on the Basis of Innovativeness Reprinted from "Diffusion of Innovasions" by Everett M. Rogers, 2003.



Innovators are the "techies:" experimentalists who latch onto new technology as soon as it appears. Their interest lies more with the technology itself than with its application to significant problems. *Early Adopters* are "visionaries" who blend an interest in technology with a

concern for significant professional problems and tasks. They are opinion leaders, respected by their peers, who look to them for leadership in adopting new technologies. *Early Majority* category includes "pragmatists" who, although fairly comfortable with technology in general, focus more on the concrete professional problems of teaching and research than on the tools (technological or otherwise) that might be used to address them. *Late Majority* is the conservative or "skeptical" latter half of the mainstream. They are similar in many respects to the early majority, though typically less comfortable with technology. Finally, *Laggards,* the last 16% of the potential adopter population is the most likely never to adopt at all (Dugas, 2005).

2.4.2. The Theory of Reasoned Action

Rogers' IDT paved the way later for several other theories and theorists who were dissatisfied with existing theoretical models in social psychology that addressed the relationship between attitude and behavior. According to Fishbein and Ajzen (1975), these models assumed that attitude was a direct predictor of behavior; however, they conceptualized a theoretical framework that suggested a specific behavior is viewed as determined by the person's intention to perform that behavior. The assumption that a behavior is directly predicted by the intention to perform that behavior is the foundation of user intention theories and the outcome of Fishbein and Ajzen's work on this framework was TRA. According to TRA (see Figure 2.2 & Figure 2.3), a person's performance of a specified behavior is determined by his or her behavioral intention (BI) to perform the behavior, and BI is jointly determined by the person's attitude (A) and subjective norm (SN) concerning the behavior in question, with relative weights typically estimated by regression (Davis, 1989; Davis et al., 1989).

Figure 2.2

Theory of Reasoned Action (Original Illustration) Reprinted from *Belief, attitude, intention, and behavior: An introduction to theory and Research*, by M. Fishbein and I. Ajzen, 1975, Reading, MA of Addison-Wesley

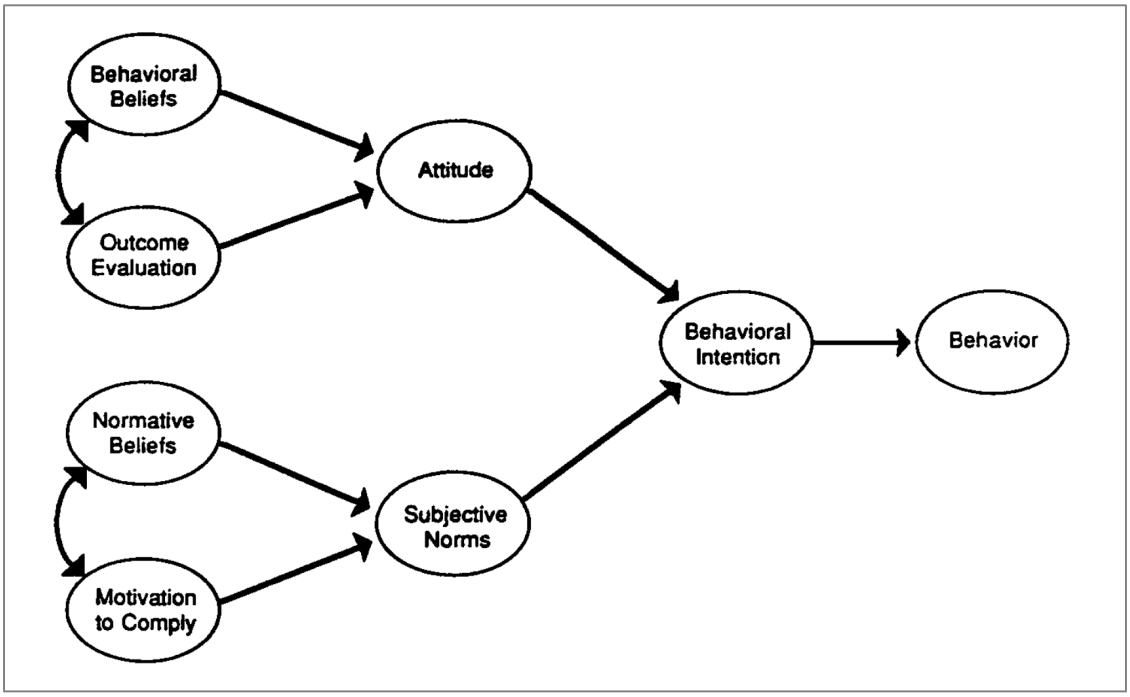
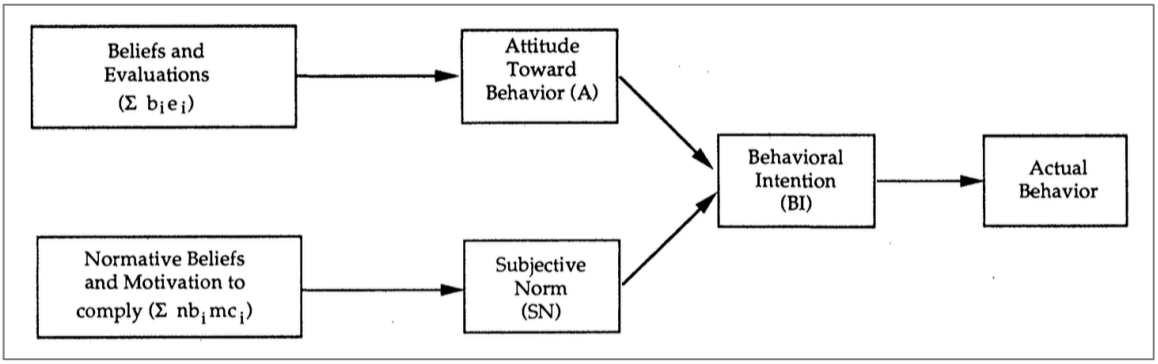


Figure 2.3

Theory of Reasoned Action (Later Illustration) Reprinted from "Perceived usefulness, perceived ease of use, and user acceptance of information technology," by F. D. Davis, 1989, *MIS Quearterly, 13,* p. 319.



2.4.3. The Technology Acceptance Model (TAM)

There are two other theories developed based on TRA, and one of these is TAM. In 1989, Davis proposed the technology acceptance model to explain the potential user's behavioral intention to use a technological innovation (King & He, 2006). TAM has been widely studied and used in different studies that examine the individual technology acceptance behavior in different information systems constructs (Surendran, 2012). The importance of TAM arises not only from identifying the reasons behind users' refusal or acceptance of a certain system, but also from improving users' acceptance through identifying those reasons of refusal (Itayem, 2014). Unique to TAM (see Figure 2.4 & Figure 2.5) is that the attitude construct is the only direct determinant of intention to use, and this model identified two specific behavioral beliefs, perceived usefulness (PU) and perceived ease of use (PEOU), as centrally relevant to attitudes toward technology usage (Paver, 2012). Unlike TRA, the final conceptualization of TAM excludes the subjective norm (SN) construct in order to better explain intention parsimoniously (Venkatesh et al., 2003). TAM has evolved over time, and TAM2 extended the original model to explain PU and BI including social influence (SN, voluntariness, and image), cognitive instrumental processes (job relevance, output quality, and result demonstrability) and experience (Park, 2009). These later additions to the existing model reflect several components posited by Rogers' IDT (2003).

Figure 2.4

Technology Acceptance Model (Original Illustration) Reprinted from "Perceived usefulness, perceived ease of use, and user acceptance of information technology," by F. D. Davis, 1989, *MIS Quearterly, 13,* p. 319.

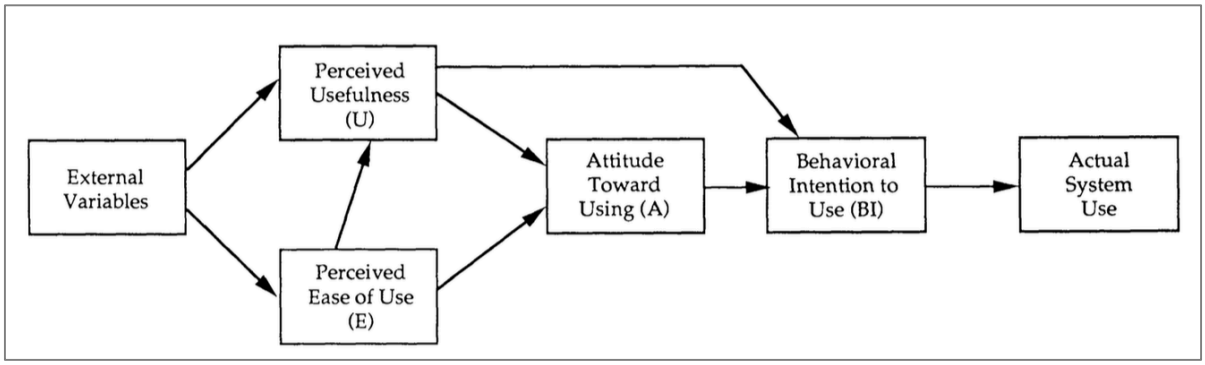
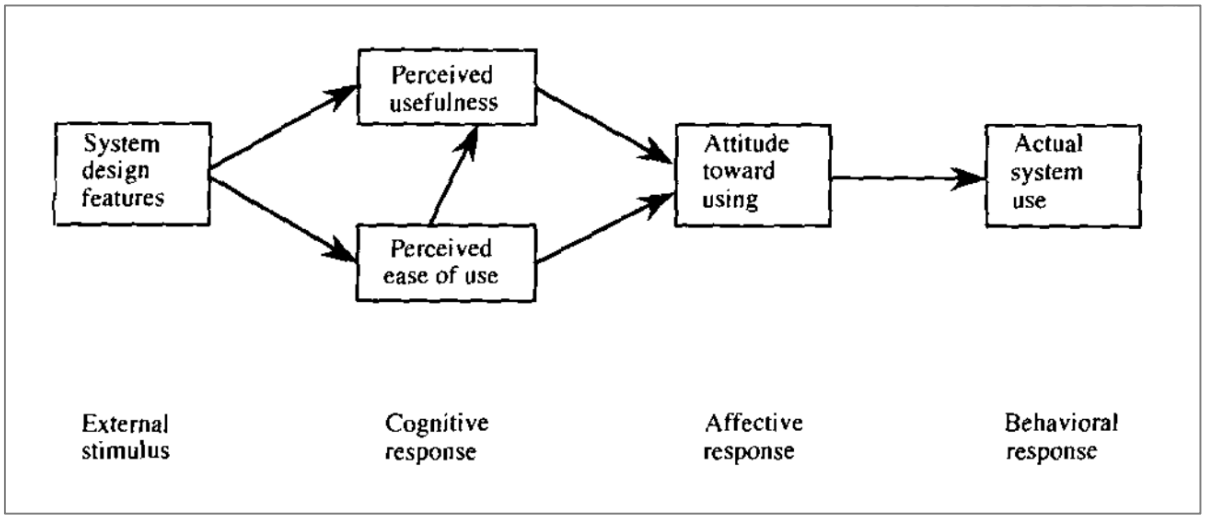


Figure 2.5

Technology Acceptance Model (Later Illustration) Reprinted from "User acceptance of information technology: System characteristics, user perceptions, and behavioral impacts," by F. D. Davis, 1993, *Int.J. Man – Machine Studies, 38,* p. 475.



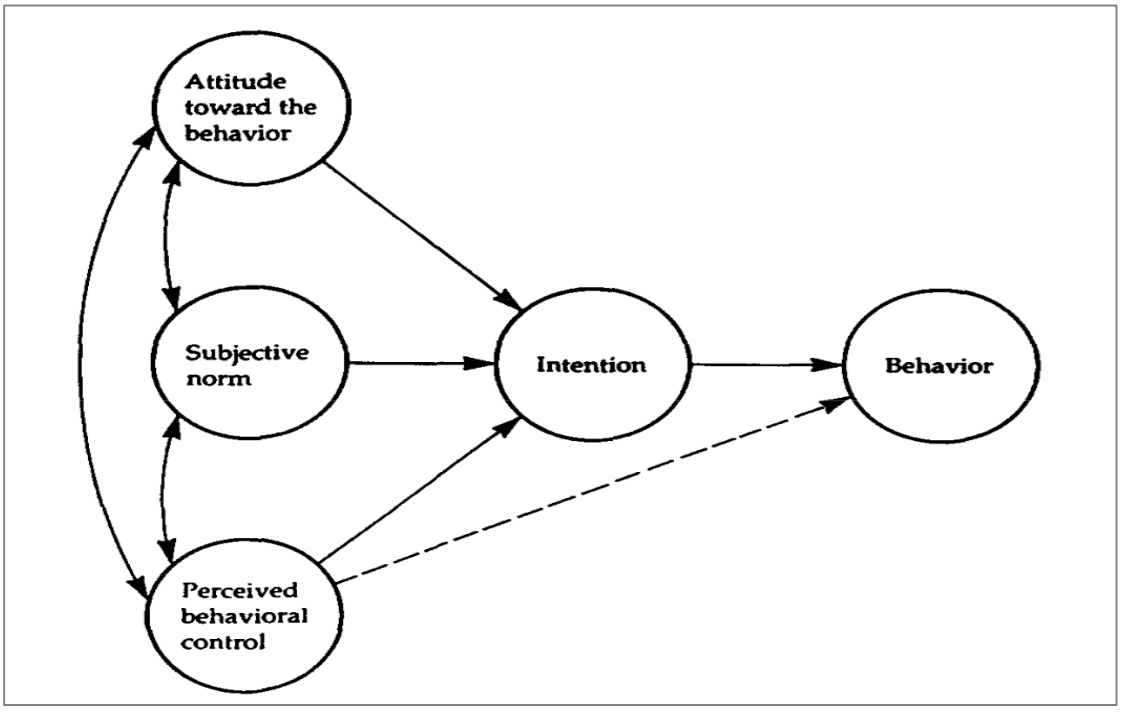
2.4.4. The Theory of Planned Behavior

The other theory developed based on the principles of a general theory of behavior, TRA, is the theory of planned behavior (TPB). TPB (Ajzen, 1991) extends TRA (Fishbein and Ajzen,

1975) to account for conditions where individuals do not have complete control over their behavior (Taylor & Todd, 1995). According to Taylor and Todd (1995), TPB (see Figure 2.6) asserts that behavior (B) is a direct function of behavioral intention (BI) and perceived behavioral control (PBC) and that BI is formed by one's attitude (A), which reflects feelings of favorableness or unfavorableness towards performing a behavior; subjective norm (SN), which reflects perceptions that significant referents desire the individual to perform or not perform a behavior; and thirdly PBC, which reflects perceptions of internal and external constraints on behavior (Ajzen, 1991).

Figure 2.6

Theory of Planned Behavior (Original Illustration) Reprinted from "The theory of planned behavior," by I. Ajzen, 1991, *The Internet and Higher Education, 12*(2), p. 71.



More formally, B is a weighted function of BI and PBC; and BI is the weighted sum of the A, SN, and PBC components (Taylor & Todd, 1995). Besides similarities to other theories, TPB

differs in that the basis of attitude lies in the salient belief that certain behaviors (e.g., pre-service teachers' use of Web 2.0 technologies) result in certain outcomes or consequences. Furthermore, each outcome is weighed by teachers' personal evaluations of the effectiveness of the outcome (Sadaf et al, 2012b). To illustrate, an individual may believe that his/her peers think that one should use IT (belief), but that complying with the wishes of peers is relatively unimportant (evaluation) (Taylor & Todd, 1995). TPB has been extensively influential in user intention studies, and, as Al-Debei et al. (2013) has found, this theory is considered useful in explaining the complexity of influences in the behavioral decision-making with a strong support in the literature demonstrating its efficacy. However, researchers who have adopted user intention theories for the study of the use of IT have found it problematic to identify specific beliefs associated with attitude toward a behavior directly from the population under study in TPB as Ajzen (1991) himself directed. In fact, they suggested that the elicitation of salient beliefs from the research population limits the generalizability of the findings across different contexts (Paver, 2012). Paver (2012) thinks that this specific problem is addressed by two research models developed specifically for the examination of the adoption and use of IT. The first model, as discussed above, is TAM, which was quite easy to implement, and the second model is the decomposed theory of planned behavior (DTPB), which will be discussed in the rest of this section.

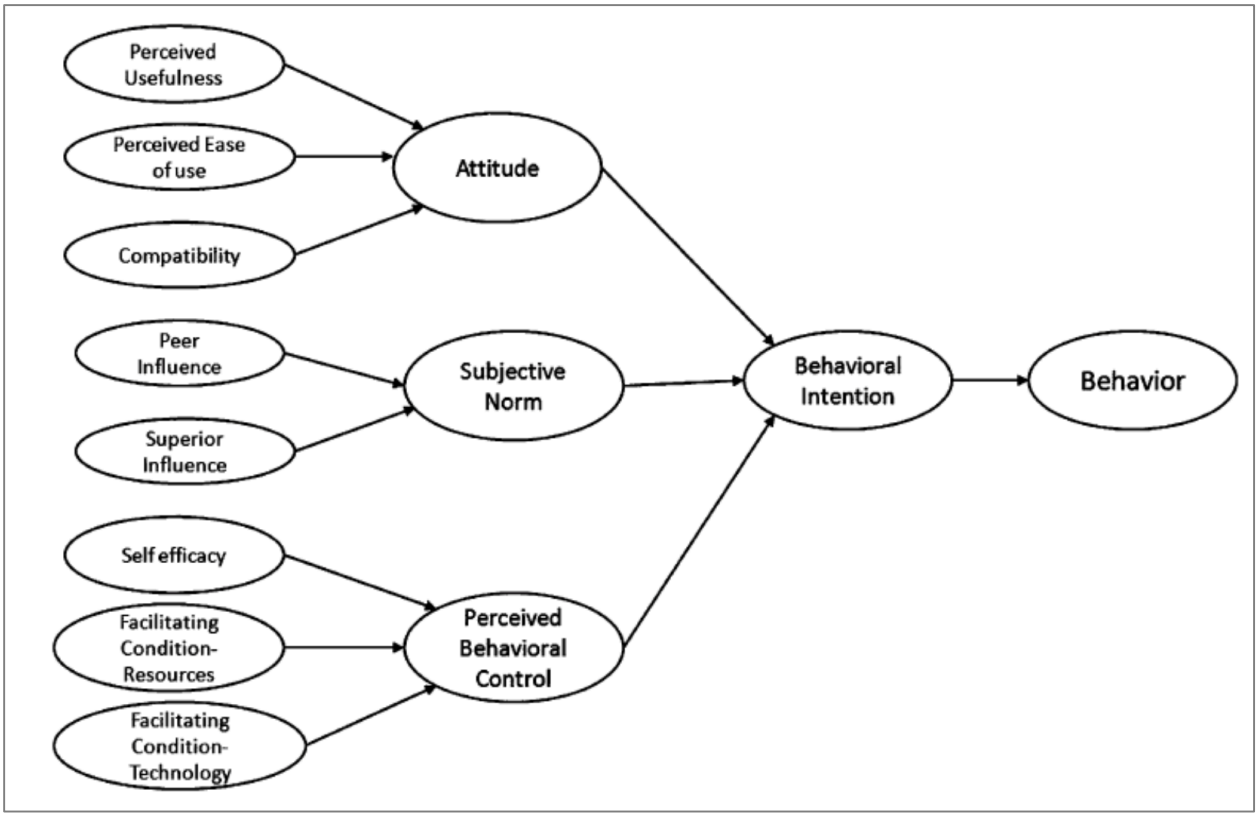
2.4.5. The Decomposed Theory of Planned Behavior

Taylor and Todd (1995) developed DTPB due to two existing issues with the previous models. Firstly, while TAM was really beneficial thanks to its simplicity and parsimonious nature, the existing research results suggested that additional factors that influence intentions to use technology might need to be considered. The second and the final problematic aspect, as also

mentioned above, was that TPB's beliefs need to be developed for each context, which usually involves a pilot study in which users are asked about relevant beliefs and evaluations regarding the three main constructs of behavioral intention —attitude (A), subjective norm (SN), and perceived behavioral control (PBC)—. Therefore, TPB was more costly to apply despite its ability to deliver more specific information and more insight into user acceptance (Mathieson, 1991). As reported by Paver (2012), Taylor and Todd reasserted the importance of these additional factors in their development of DTPB (see Figure 2.7).

Figure 2.7

Decomposed Theory of Planned Behavior (Original Illustration) Reprinted from "Understanding information technology usage: A test of competing models," by S. Taylor and P. A. Todd, 1995, *Information Systems Research, 6*(2), p. 144.



This new model built upon the predictive strength of TPB while incorporating aspects from IDT. Sadaf and colleagues (2012b) underline that DTPB explores A, SN, and PBC by decomposing them into belief-based indirect measures. For example, *perceived usefulness* (belief that innovations will help perform better in jobs)*, ease of use* (belief that using innovations will be free of effort), and *compatibility* (degree to which innovation adoption fits the task, values, and needs of a user) explain A; *peer influence* and *superior influence* explain SN; and *self-efficacy* (the perception of how well one can perform a behavior) and *facilitative conditions* (environmental factors that influence an individual's desire to perform a task) explain PBC. Taylor and Todd (1995) suggested that DTPB provides increased explanatory power and a more precise understanding of the behavior. Therefore, DTPB provides a comprehensive way to understand how an individual's A, SN, and PBC can influence his or her intentions to adopt innovations (Ajjan & Hartshorne, 2008), and it achieves this without an additional cost of eliciting salient beliefs and evaluations which are already presented per se. Moreover, as also mentioned above, DTPB has also benefited from the innovations literature in that the attitudinal belief dimensions were derived from Rogers' IDT. As also mentioned before, IDT dictates core constructs for innovations to be diffused as relative advantage, ease of use, image, visibility, compatibility, results demonstrability, and voluntariness of use (Venkatesh et al., 2003), and Taylor and Todd used three of them —relative advantage, complexity, and compatibility— to decompose attitude (A) in the new model. Other constructs were derived from TPB implementations to elicit salient beliefs and evaluations and validated in accordance with innovations literature.

2.4.6. User Intention Theories and Research in Emerging Educational Technology

There is extensive research on technological innovations through the models and theories explained above in user intention and innovations literature. These studies range from agriculture to banking, or from healthcare to consumer markets; however, the number of studies in educational technology and especially emerging technologies are limited. Its use is rare in the field of language pedagogy although there is much research focusing on perceptions, beliefs, and reasons for adopting technologies by learners and teachers. For instance, although Rogers' IDT and innovations diffusion work has been used extensively in diverse areas, Dugas (2005) states that only few have been found that study the issue of degree of innovativeness as represented by adopter category and teaching styles. As an example for one of the few studies based on adopter categories and language learning with also a focus on mobile learning, Kim et al. (2013) conducted pre and post surveys to examine how students' perceptions of ML change through a semester of a class in which ML is encouraged via TACI that was developed by Dugas (2005). Although TACI is not exploited much, the study (Kim et al., 2013) demonstrates that being exposed to emerging technologies in language pedagogy can influence learners' perceptions and increase their willingness to adopt ML into the language learning process. In another study, Itayem (2014) implemented TAM to see the factors affecting users' behavioral intention of iPad use in language pedagogy, and found out that students' perceptions of the iPad's perceived usefulness (PU) and perceived ease of use (PEOU) have direct effects on their attitude (A) towards using the iPad, which directly impacts the students' behavioral intention (BI) to use the iPad in their language courses and other contexts. Itayem (2014) reveals that the results of the study provide an insight of some reasons behind students' rejection or acceptance of the iPad in their language courses. Rogers (2003) insists that getting a new idea adopted, even when it has

obvious advantages, is difficult, and when a technology with obvious advantages are not adopted by faculty or students, it cannot practically have any benefits in any contexts. Therefore, the innovations literature and user intention theories provide a great insight into acceptance patterns and factors behind BIs.

Venkatesh and colleagues' research (2003) and other similar studies (King & He, 2006; Legris et al., 2003; Taylor & Todd, 1995) reviewed studies based on user intention theories, and these theories or models explained as much as 70 percent of the variance in user intentions to use information technology. For instance, in a study done by Sadaf et al. (2012a) in order to explore factors that predict pre-service teachers' intentions to use emerging Web 2.0 technologies, the path analysis results of DTPB demonstrate that BI had a significant effect on actual behavior, and the B equation addresses 70.6% of the variance. In another study that used DTPB to examine student decisions to adopt emerging Web 2.0 technologies, Hartshorne and Ajjan (2009), regression results confirmed each of the three factors, perceived usefulness (PU), perceived ease of use (PEOU), and perceived compatibility (C), explained a significant variance (74.6%) in attitude (A). One final study using DTPB to investigate faculty decisions to adopt Web 2.0 technologies by Ajjan and Hartshorne (2008) demonstrated that each of the three factors, A, SN, and PBC explains a significant variance (75.4%) in BI. Considering these results gained through the innovations literature and user intention theories, the idea that one's adopter category, whether a learner or a teacher, and having a sound understanding of the factors behind behavioral intention and actual behavior might offer important implications on the use of emerging technologies in language pedagogy. Rogers (2003) claims that the part of the diffusion curve from about 10 percent adoption to 20 percent adoption is the heart of the diffusion process, and after that point, it is often impossible to stop the further diffusion of a new idea, even if one

wished to do so. Therefore, if a certain technology is proven beneficial, having a working knowledge of teachers or learners' (1) adopter categories, and (2) factors predicting their behaviors could absolutely empower researchers, educators, administrators, and institutions in making sound decisions with regard to the use of emerging technologies in language pedagogy.

2.4.7. Future Research in User Intention Theories

Taking into account all user intention theories mentioned above, ranging from TRA and TAM to TPB and DTPB, all these theoretical models employ intention and/or actual usage as the key dependent variable. Thanks to these models and theories, the role of intention as predictor of behavior is critical and has been well established (Venkatesh et al., 2003). However, the other independent variables and how they affect intention and one another have gone through radical changes. Due to the complex nature of human behavior and the diversity of referent areas, it is hard to come up with a unified working model to explain behavior and factors predicting it. As one of the most recent theories developed based on user intention research, the decomposed TPB, Taylor and Todd (1995) state, provides a fuller understanding of usage behavior and intention, which may provide more effective guidance to IT managers and researchers interested in the study of system implementation. As it is obvious and as also mentioned above, none of these theories or models was developed with language teachers and learners in mind with a focus on language pedagogy. Therefore, based on the current literature and well-established theories of SLA, a few components can be added to user intention theories. One of the reasons why these theories are criticized is that they view behavior as a very mechanical process. Statistically, the models all proved to be efficient in predicting behavior, but it is still true that DTPB as one of the most recent versions of all overlooks emotional variables such as stress (Frank et al., 2004), threat, fear, mood and negative or positive feelings (Venkatesh et al., 2003). For instance, DTPB

benefited from Rogers' IDT in decomposing attitude, but factors such as image (the degree to which use of an innovation is perceived to enhance one's status in a social system), or voluntariness of use (the degree to which use of the innovation is perceived as being voluntary, or of free will) do not seem to be reflected in this theory. Moreover, especially language learners in mind, *affect toward use* seems to be a valid factor both in the Model of PC Utilization and Bandura's Social Cognitive Theory (Venkatesh et al., 2003) to predict behavior. Thompson et al., (1991) define it as feeling of joy, elation, or pleasure, or depression, disgust, displeasure, or hate associated by an individual with a particular act. Taking into account language learners at various ages, affect or this kind of emotions might be powerful in predicting behavior and their usage of emerging technologies today such as SNSs, ML, or DGs. However, as with image and voluntariness, affect is also not reflected in DTPB.

All in all, although innovations literature and user intention theories hold a significant potential to explain behavioral process, predict behavior and also usage of emerging technologies in language pedagogy, they are not exempt from deficiencies and issues. Since these theories are not specifically developed with language learners and teachers in mind, this is quite understandable. Therefore, rather than building a new theory or model to meet this research need, what is needed is to build upon existing theories which have already shown to be statistically powerful in behavioral analysis and in validating factors predicting and explaining usage of new technologies.

2.5. Discussion and Conclusion

This dissertation explores language learners' approach to technologies in general, first, by investigating learners' attitude toward most recent emerging technologies with a focus on their familiarity, actual use, intentions and perceptions, and, second, by analyzing the factors that best

predict language learners' intentions and decisions to use emerging technologies. To this end, this literature review has addressed the following relevant topics:

(1.a.) A brief theoretical and historical perspective of CALL has been presented in line with the schools of thoughts for learning and theories of second/foreign language pedagogy in order to make sense of the overall context and where this study has been situated.

(1.b.) Digital tools that are considered emerging and new technologies, and their general pedagogical values in second/foreign language pedagogy have been described in details. This study specifically focuses on social networking, mobile learning, digital games as major emerging technologies with also a focus on other emerging technologies such as augmented reality, wearable technologies, virtual assistants, massive online open courses, 3D printing and online language learning platforms. Accordingly, this section has provided detailed information regarding both affordances and constraints of the above-mentioned technologies.

(2) Since the target participants of the study are EFL learners, their perceptions based on respectively attitudinal, societal (subjective norms), and perceived control factors that might have a direct effect on their decision to use a certain digital tool have been explored based on the current literature.

(3) Finally, innovations literature and user intention theories with a focus on their implications in education and language pedagogy has been presented in this section by also referring to existing research and studies in the academic literature.

Considering all these three main topics, there has been a vast amount of research based on the use of technology in language classrooms, but research based on especially emerging technologies is missing. From a technological perspective, this kind of research can be valuable in terms of measuring both pros and cons of technology integration. In addition, this might

contribute to the creation of new tools or adapting the existing ones in line with research findings, which might only be possible with contributions by developers. From a pedagogical perspective, this chapter has listed several uses of technology in language classrooms based on the findings from several studies. These studies mostly targeted learners and learners' perspective. However, as also emphasized before, while there is a plethora of research about learners' perceptions of various emerging technologies used in language pedagogy, there is a paucity of information and research that could move beyond generic perception studies especially regarding given minor emerging technologies. Finally, from a research perspective, this chapter emphasized the importance of user intention theories which have been vastly used in different disciplines. As it might be obvious in this chapter, the literature is missing the use of innovation diffusion and user intention theories especially in language pedagogy although it is evident that these theories can be utilized to deconstruct behavior and behavioral intention to do a critical analysis of the factors that have an influence on the adoption of emerging technologies in language pedagogy. To this end, there needs to be a study utilizing these models in order to fill in this gap in language pedagogy research.

All in all, the current study has three main components which are (1) emerging technologies, (2) EFL learners as participants and (3) the theoretical framework based on innovation diffusion and user intention theories, all of which aim to fill in the gap in the existing language pedagogy literature by developing a parsimonious theory and a model to statistically compare the effectiveness of using emerging technologies with any target groups of audience, and so to contribute to existing scholarly research in language pedagogy. In this chapter, all the related aspects of the study have been presented and elaborated in the existing literature. The

next chapter will expand on the research topics, adding approaches to investigate the research questions, and the methods to analyze the data collected.

CHAPTER THREE:

METHODOLOGY

3.1. Overview of the Chapter

This chapter presents a detailed view of the methodology of the study, and describes the principles and procedures of the methods that were implemented in this study. First, the chapter provides an overview of the study by focusing on why the research topic has been chosen, and lists the research questions with brief information regarding their scope. Subsequently, the theoretical framework has been presented including additions and adaptations justified in accordance with existing research and literature. The chapter then describes the setting and elaborates on the sample, which is followed by the depiction of data collection instruments. Finally, a detailed discussion of the methods and procedures employed for data collection and data analysis follows. The chapter concludes with a brief summary of the methods of the study and an overview of the research design.

3.2. Research Topic

Technology, currently as an indispensable part of education in general, is one of the foci of scholarly work, and there is always a need to experiment with educational technology in language pedagogy research.

Secondly, since several technologies have been extensively researched for a long time, focusing on emerging technologies is an imminent need in order not to fall behind technological progress made in non-educational work and domestic environments. Thirdly, rather than

overgeneralizing today's learners as digital natives, or as members of the net generation who are expected to adopt any kind of technology, research in language pedagogy should meticulously target learners' perceptions and underlying factors influencing their intentions and use of technology. Finally, there is also a very strong need to develop a parsimonious theory and a model to statistically compare the effectiveness of using emerging technologies in language pedagogy with a focus on any target audiences.

As a result, in order to fulfill the above-mentioned needs, and to contribute to existing scholarly research in language pedagogy, this study focuses on educational technology and language pedagogy in quite general terms and posits EFL learners in terms of their adoption of emerging technologies in their language learning processes in order to build a working theoretical model for an effective statistical comparison as mentioned above.

Regarding the technologies focused on in this research, they are essentially based on the most recent NMC Horizon Reports, annually published as part of the NMC Horizon Project, which was already detailed in the previous chapter (Johnson et al., 2016). This research takes into account the NMC Horizon reports of the last eight years (see Table 3.1 for a complete list of emerging technologies), and significantly benefitting from research in the area of social psychology, the study specifically focuses on social networking sites (SNSs), mobile learning (ML) or mobile devices (MDs) and digital games (DGs) as major emerging technologies of today with also a focus on other emerging technologies such as augmented reality (AR), wearable technologies (WTs), virtual assistants (VAs), massive online open courses (MOOCs), 3D printing and online language learning platforms (OLLPs).

Table 3.1

Time-to-adoption Summary Chart of the Past Eight-year Period Regarding New Technologies published by NMC annual Horizon Report: Higher Ed. Edition

Adapted from the web source: (Source: http://its.uiowa.edu/support/article/100560)

NMC Horizon Reports: Higher Ed Edition	Time-to Adoption Horizon When These Technologies Are Likely To Have A Large Impact on Teaching and Learning in Higher Education		
	1 year or less	2-3 Years	4-5 years
2016	Bring your own device (BYOD) Learning Analytics and Adaptive Learning	Makerspaces Augmented and Virtual Reality	Affective Computing Robotics
2015	Bring your own device (BYOD) Flipped Classroom	Makerspaces Wearable technology	Adaptive learning technologies The Internet of things
2014	Flipped classrooms Learning analytics	3D printing Games and gamification	Quantified self Virtual assistants
2013	Massively open online courses (MOOCs) Tablet computing	Games and gamification Learning analytics	3D printing Wearable technology
2012	Mobile apps Tablet computing	Game-based learning Learning analytics	Gesture-based computing Internet of Things
2011	Electronic book & Digital Content Mobiles	Augmented reality Game-based learning	Gesture based computing Learning analytics
2010	Mobile computing Open content	Electronic books Simple augmented reality	Gesture based computing Visual data analysis
2009	Mobiles Cloud computing	Geo-everything Personal web	Semantic-aware applications Smart objects

3.3. Research Questions

The purpose of this study is three-fold: to identify language learners' approaches to technologies; to examine their attitude toward emerging technologies with a focus on their familiarity, actual use, intentions and perceptions; and finally to analyze the factors and

relationships among these factors that best predict language learners' intentions and decisions to use emerging technologies. Hence, in light of the current research and emerging technologies listed before, the current study will focus on the following research questions:

3.3.1. Research Question #1

How do language learners approach new technologies in general?

The first research question aimed to categorize students based on what they think about technology and how they adopt new technologies in general. The study focuses on several specific emerging technologies; however, what was underlined in this question is that participants were asked to consider any new technologies they use in general, not just educational or certain emerging technologies. The rubric for Technology Adopter Category Index (TACI) was adapted and used as part of the overall survey tool and students were asked to select the best option among nine different adopter categories in order to address this research question.

3.3.2. Research Question #2

How do language learners perceive emerging technologies used for learning a foreign language?

What was meant by emerging technologies in this question is social networking, mobile learning, and digital games as major emerging technologies of today with also a focus on other emerging technologies such as augmented reality, wearable technologies, virtual assistants, massive online open courses, 3D printing and online language learning platforms. The question aimed to explore EFL learners' perceptions of certain emerging technologies through matrix table survey items which were also supported and elaborated by several open ended survey items. This research questions had four distinct aspects to explore learners' perceptions, and

these aspects are: (1) familiarity with or proficiency in use of listed emerging technologies, (2) participants' actual use of emerging technologies, (3) EFL learners' intentions to use given emerging technologies, and (4) benefits and drawbacks of using given emerging technologies.

3.3.3. Research Question #3

What factors best predict language learners' intentions to use emerging technologies?

The final research question's purpose is to investigate the dynamics or elements that trigger EFL learners' intentions to adopt listed technologies. This question focused on only three major emerging technologies which are social networking, mobile learning, and digital games. In order to gather data for this research question, an adapted DTPB scale was given to the participants, and they were asked to respond to a questionnaire based on a 5-point Likert scale. Both DTPB as a user intention theory and the adapted DTPB scale have been elaborated in the rest of this chapter. What makes this research question and DTPB scale unique is that the focus is on the connection among a series of related factors rather than a single factor and the effect.

3.4. Theoretical Framework

The present research uses two complimentary theoretical frameworks to address research questions. First, in an effort to analyze EFL learners' approach toward using technologies in general, TACI was chosen as a theoretical framework and a rubric was adapted to collect data. As the second framework, DTPB was used to investigate factors predicting learners' intentions to use given emerging technologies. However, it should be stressed that DTPB was modified and additional constructs were added in an effort to explain more of the variance in intentions of EFL learners' adoption of emerging technologies. In the following section, the given theoretical frameworks are elaborated with a focus on how they were used in this study.

3.4.1. Innovation Diffusion Theory (IDT) and Technology Adopter Category Index (TACI)

Rogers' IDT and related technology adopter categories (TACI) (Dugas, 2005) are used to elaborate on learners' approach toward both educational technology and technology in general. Rogers' classification of adopters has been adapted to support studies in many areas. Each adopter category consists of individuals with a similar degree of innovativeness. Thus, the adopter categories are a means of convenience to describe the members of a system (Dugas, 2005). Geoghegan (1994) provides a good description of the adopter categories as used to describe the adoption of educational technology, which is named as TACI (as cited in Dugas, 2005):

> *Innovators*: This group includes the "techies:" experimentalists who latch onto new technology as soon as it appears. Their interest lies more with the technology itself than with its application to significant problems. They know the details of all the new hardware and software; and they are a significant resource for vendors who need to test a new product. Innovators are often broadly connected, and they form communities of shared interest that span both disciplines and institutions.
>
> *Early Adopters*: These "visionaries" blend an interest in technology with a concern for significant professional problems and tasks. They look for the breakthroughs in instructional methods or learning effectiveness that new applications of technology enable. They explore new technologies for their potential to bring about major improvements through qualitative, discontinuous change. They are risk- takers and are not averse to occasional failure. They often favor a tightly focused project orientation in their work. Like the innovators, they are broadly connected within the academic

community, with good links to "innovators," and with strong cross-disciplinary interests and ties. They are often quite self- sufficient from a technical standpoint, either through their own skills or through resources mustered through personal networks. Early adopters are opinion leaders, respected by their peers, who look to them for leadership in adopting new technologies.

Early Majority: These are the "pragmatists" who, although fairly comfortable with technology in general, focus more on the concrete professional problems of teaching and research than on the tools (technological or otherwise) that might be used to address them. They adopt a "wait-and-see" attitude toward new applications of technology and want solid references and examples of close-to-home successes before adopting. They are not interested in abrupt, discontinuous change, but are more attuned to evolutionary modification of existing processes and methods. They want to see compelling value in an innovation before adopting it. As a group the mainstream is more risk averse than the innovators and early adopters. Their networks are predominantly vertical, focused within the home discipline or discipline area. The early majority tend to adopt an innovation a little earlier than the average adopter.

Late Majority: This is the conservative or "skeptical" latter half of the mainstream. They are similar in many respects to the early majority, though typically less comfortable with technology. By definition, they accept innovation late in the game, once the change has already become well established among the majority. The late majority tend to adopt an innovation a little later than the average adopter. Their level of risk aversion is high and their communication networks are vertically oriented; that is, focused within the home discipline area.

Laggards: The last 16% of the potential adopter population is the most likely never to adopt at all. Their point of reference is the past and they base decisions on what has been done previously. In teaching they are unlikely to employ educational technology. (Dugas, 2005).

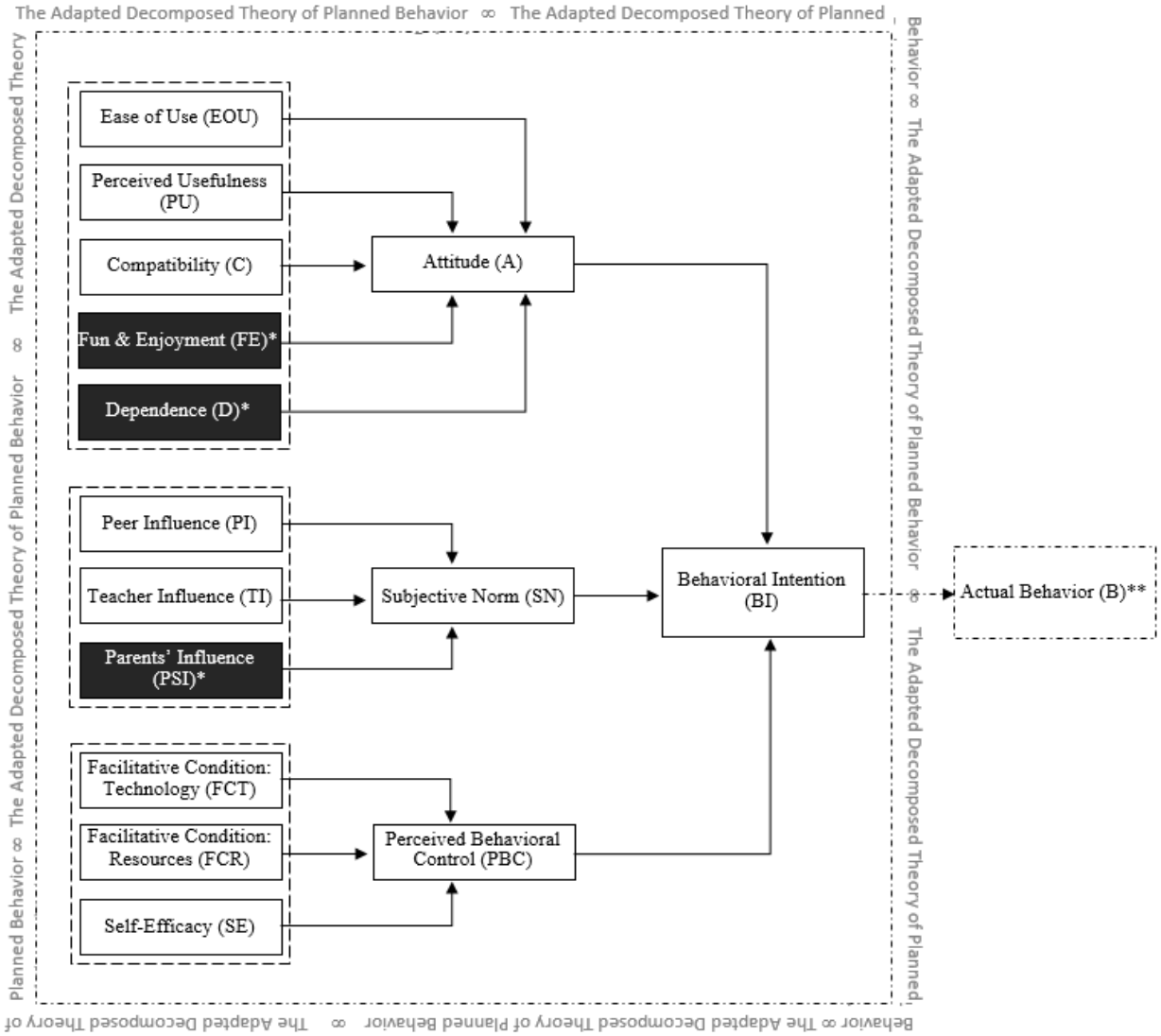
3.4.2. Decomposed Theory of Planned Behavior (DTPB)

As another major theory and model adapted and utilized in this study, the DTPB (Taylor &Todd, 1995) is a comprehensive model and includes all the important constructs of previous models that might influence language learners' intentions to use technology. In an effort to analyze language learners' intentions and decisions to use three major emerging technologies (SNSs, DGs, ML), the DTPB has been chosen as a theoretical framework. In fact, the DTPB, as Sadaf (2013) states, provides a comprehensive way to understand how an individual's attitude, subjective norms and perceived behavioral control can influence his or her intention to use technology (see Figure 2.7 for the original DTPB). However, it is still a fact that DTPB as one of the most recent versions of all user intention theories overlooks emotional variables such as stress (Frank et al., 2004), threat, fear, mood and negative or positive feelings (Venkatesh et al., 2003), and assesses them in a limited fashion. For instance, DTPB benefited from Rogers' IDT in decomposing attitude, but factors such as voluntariness of use (the degree to which use of the innovation is perceived as being voluntary, or of free will) do not seem to be reflected in this theory. Moreover, especially with language learners in mind, *affect toward use* seems to be a valid factor both in the Model of PC Utilization and Bandura's Social Cognitive Theory (Venkatesh et al., 2003) to predict behavior. Thompson et al., (1991) define it as feeling of joy, elation, or pleasure, or depression, disgust, displeasure, or hate associated by an individual with a particular act. Taking into account language learners at various ages, affect or this kind of

emotion might be powerful in predicting behavior and their usage of emerging technologies today such as SNSs, ML, and DGs. However, as with voluntariness, affect is also not reflected in DTPB. As a result, in this study, the original DTPB model has been adapted, and *attitude* in the original DTPB has been decomposed into two more additional factors as *fun/enjoyment* and *dependence* in relation with *affect toward use* and *voluntariness* (see Figure 3.1 for the adapted DTPB model for this study).

Figure 3.1

The Adapted Decomposed Theory of Planned Behavior Model



Note. * These factors / variables were added to the existing DTPB model in the present study
** This variable exists in the model but not included in this study

Moreover, subjective norms have also been decomposed into one further sub-factor taking today's language learners into account. Based on the original DTPB, peers and teachers are two of the important factors that have an influence on learners' intentions through subjective norms. However, it has been hypothesized that the social environment like the attitudes and approaches of *parents* in addition to classmates and teachers can influence learners intentions to use emerging technologies (Liu, 2009; Kourieos & Evripidou, 2013; Hartshorne & Ajjan, 2009; Decuypere & Bruneel, 2012).

Finally, as for the adapted DTPB model for this study, it should be noted that actual behavior (AB) has been excluded from the model since this research focuses on several emerging technologies rather than only one tool, and participants' actual behavior was not measured through the DTPB scale. As explained before, Figure 3.1 illustrates the complete DTPB, but the framework that is utilized in this research is shown in the dashed frame.

All in all, in an effort to understand learners' approaches to educational technology, and technology in general, Rogers' IDT presents valuable information and accordingly the Technology Adopter Category Index has been chosen as one of the two models in this research study. As the second model, the DTPB has been chosen as a theoretical framework and the original model has been modified with the addition of three more variables (*fun/enjoyment, dependence, and parents' influence*) to better analyze language learners' intentions to use three main emerging technologies (see Figure 3.1).

3.5. Research Setting

The research was conducted in the Northwest of Turkey and specifically in Istanbul. A state and a foundation university were selected to distribute surveys and conduct interviews.

With specifics regarding the research instruments detailed in the following sections, the current section presents the overall setting and also elaborates on the specific context of the universities where the research was conducted.

In Turkey, there are around 190 universities as of 2016, and according to the British Council's report on the state of English in higher education in Turkey, the country has seen a rapid growth in the number of universities and the total has more than doubled in the past 15 years (West et al., 2015). There are both state and foundation universities, and state universities are financed by the government, while the foundation universities are managed by not-for-profit organizations called foundations. The medium of instruction at universities is Turkish, English or mixed Turkish-English depending on the department and the university. Almost half of all the universities in Turkey use English as the medium of instruction. When the medium of instruction of an undergraduate or graduate program is English, students are required to prove their English proficiency before taking classes listed as part of their programs. If they are not able to certify their language levels through a standard exam approved by the board of the university, students have to attend Intensive English Programs (IEPs) also called English Preparatory Programs in Turkish context for a maximum of two years until their language levels are certified. At most universities, the range of language levels is in line with the Common European Framework, with lower levels being A1 (elementary) and A2 (pre-intermediate) levels and rather higher levels as B1 (intermediate) and B2 (advanced) language levels. Whenever students are able to pass a standard proficiency test approved or conducted by the university, they can start taking classes toward their degrees. Regardless of the level, students are exposed to a minimum of 20 hours of language instruction per week, and they are expected to take more language classes such as English for specific purposes (ESP) or advanced skills classes. Most universities, whether state

or foundation, promote the use of technology reflected as part of universities' mission or vision statements, and they are funded sufficiently to make technological resources available for their students.

Before students are enrolled at universities, they are educated through a 12-year school system where the first four years make up the primary school, and the next four years being the secondary school with the last four years as the high school. As for the use of technology in school life prior to university education, along with the current effort to modernize the English language teaching program in Turkey, the Turkish Ministry of National Education has recently introduced an innovative project "Movement of Enhancing Opportunities and Improving Technology" known as the FATIH project, which aims to equip classrooms throughout the country with interactive white boards (IWBs), monitors and computers, as well as providing learners with tablets, an undertaking which was piloted in 2012, and is expected to be carried out over the next several years (Celik & Aytin, 2014). Although the overall goal of the project was to make technological resources available across the country, it has been widely criticized by the educators and researchers both locally and internationally as only a techno-centric project in which content and teacher training were not addressed with the claim that the tablets or laptops distributed free of charge as part of this project were not utilized effectively. Nevertheless, it has also been reported that more than 80% of all the classrooms have been equipped with computers and interactive white boards, and similarly enrolled K-12 students have been provided with tablet computers and technology available at their disposal with reportedly almost half a million online students out of 16 million in FATIH project learning management system during peak times. Furthermore, the project components apparently do recognize being techno-centric in addition to hardware, teacher training and content as aspects that must be addressed.

Considering language teaching prior to university education, students take several language classes starting at early grades; the British Council report states that students enter preparatory school or IEPs with low English proficiency levels and low motivation (West et al., 2015).

In order to represent the above-mentioned language pedagogy and technology context effectively, two universities, one of them being a foundation and another being a state university, were selected as settings where the study was conducted. These two universities are representative of all in the sense that the medium of instruction is Turkish, English or mixed depending on the university. Moreover, technology is one of the aspects promoted sufficiently as part of the goals of these universities. Finally, since these universities have a total of more than twenty thousand enrolled students, the sample size in this research might represent the population effectively due to students' diversity in terms of their educational background, study areas, and language levels and their access to technology, which will be detailed in the next section.

3.6. Participants

This study was carried out with college or, as they are called in a Turkish context, university students who are learning English in order to prove their English proficiency and continue with their further undergraduate or graduate studies in Turkey. The participants were equally distributed between a private and a public university, and they were enrolled in Intensive English Programs (IEPs) at the time of data collection. As mentioned above, the role of IEPs run by universities is to teach English to undergraduate and graduate students so that they can achieve a required degree of language proficiency before enrolling in their programs in which English is the medium of instruction. IEPs require students to go through a very intensive

curriculum loaded with language activities, and most of the teachers in these programs make use of technology in their teaching processes. The participants for this study included IEP students who were enrolled in these programs in Turkey. Sample size is closely linked to effect size and power. Cohen and Cohen (1975) demonstrate that with a single predictor that in the population correlates with the dependent variable at .30, 124 participants are needed to maintain 80% power. With five predictors and a population correlation of .30, 187 participants would be needed to achieve 80% power. However, since the DTPB has been used extensively in user intention research, there are also studies that followed various formulae to define the sample size. This study follows VanVoorhis and Morgan's (2007) study that states, for regression equations using six or more predictors, an absolute minimum of 10 participants per predictor variable is appropriate. Since the adapted DTPB in this study consists of fifteen predictors, a minimum of 150 participants were required for a strong power and effect size. As a result, the participants in this study were dispersed between a state and a private university by also meeting the minimum requirement of participants based on a single university, and a total of 472 (n=472) participants responded to the survey from two different universities (see Table 3.2).

Table 3.2

The Distribution of the Participants Based on Gender

#	Answer	Number	Percent
1	Male	253	54%
2	Female	219	46%
	Total	472	100%

There was almost an equal distribution based on gender, and while 54% of the participants were male (n=253), the other 46% were female students (n=219). Since the survey was composed of four different scales, a number of missing responses were observed. Instead of completing the missing data with suggested statistical recoding methods, the missing data were

not included in calculations because the sample that had already been collected in this research was sufficient for further statistical analyses. Table 3.3 shows the total number of responses for each section of the survey and the percentages relative to the total sample.

Table 3.3

Number of Responses and Participation based on each Section of the Survey

#	Section	Responses	Percent
I	Demographic Items	472	100.0%
II	TACI Rubric	467	98.9%
III	Attitude Scale	470	99.5%
IV	Open-ended Items	389~400	82.4-84.7%
V	The DTPB Scale	452	95.7%
VI	Sign-up for an Interview	194	41.1%

As for the qualitative data, a purposive sampling method was used to choose participants for one-on-one interviews based on the survey questions. The criteria for selection included representation from different genders and language proficiency level to understand common perceptions about the use of emerging technologies from different perspectives. A total of 8 participants (n=8) were selected (4 males and 4 females), and they were distributed among four levels of language proficiency starting with lower levels being A1 (elementary) and A2 (pre-intermediate) levels and rather higher levels as B1 (intermediate) and B2 (advanced) language levels (see Table 3.4).

Table 3.4

Representative Sample for the Interviews

	A LEVEL		B LEVEL	
	A1 (Elementary)	A2 (Pre-intermediate)	B1 (Intermediate)	B2 (Upper-Intermediate)
Female	1	1	1	1
Male	1	1	1	1

3.7. Research Instrument and Data Collection

3.7.1. Survey instrument

In this research study, the survey consists of six main sections: (a) demographic items, (b) a rubric for Technology Adopter Category Index, (c) attitude scale followed by (d) open-ended questions, (e) DTPB scale and (f) a separate section for the participants to sign up for an interview (see Appendix A for the complete survey). The survey was developed in both Turkish and English by using Qualtrics software to enable participants to select the language they feel most comfortable with, and to overcome language-related validity threats. Participants were able to take the survey online on any devices and platforms with a link provided to them, and submit their responses electronically when completed.

The first section of the survey (see Appendix A, section I) consists of questions based on demographic features of participants such as gender, university enrolled, major area of study, language proficiency levels, device ownership, comfort levels with computers and Internet technologies.

The second section of the survey were adapted from TACI developed by Dugas (2005) (see Appendix A, section II). According to the TACI rubric, participants were expected to select one option among 9 different options to reflect their approach to the adoption of new technologies. What was underlined in this section is that participants were asked to think about technology in general rather than only educational technologies or technologies that were focused on in this research. The TACI score is inversely proportional to the participants' degree of comfort with innovation. That is, an individual with a low TACI score is very comfortable with innovation, while an individual with a high TACI score is not comfortable with innovation (Kim et al, 2013). For instance, the statement "I tend to adopt new technology as soon as it is

available to me' and my interest lies more with the technology itself than with its application to specific problems" is labeled with a score of 1, and represents the highest degree of comfort with innovations, while another statement "I am usually not interested in adopting new technology" has a score of 9, and implies that an individual is uncomfortable with innovation. For the purpose of this study, a TACI classification demonstrates participants' willingness to adopt emerging technologies in their own classrooms in the future.

The following two sections of the survey were adapted from two different previous studies by Hartshorne and Ajjan (2009), and Sadaf (2013). A request was made to the authors to adapt the survey, and permission was granted. Hartshorne and Ajjan (2009) used the survey to examine student decisions to adopt Web 2.0 technologies. Sadaf (2013) used the survey to investigate factors influencing pre-service teachers' intentions and actual integration of Web 2.0 technologies. Since the population for the current study is EFL learners, the instrument has been validated for the current sample during the development and adaptation stage. The wording of many survey items has also been modified to better fit the population. For instance, the statement "I feel that using Web 2.0 will help my students/me learn more about the subject" has been modified to "I feel that using emerging technologies will help me learn more about the subject". Additionally, since three more variables have been added and the original DTPB scale has been adapted, new constructs have been created by following the same pattern as the other survey items. For example, similar to survey item for ease of use: "I feel that emerging technologies will be easy to use in language learning", the survey item for fun/enjoyment has been created accordingly: "I feel that it will be fun to learn and practice a language with emerging technologies.

The third and the fourth section of the survey measure language learners' attitudes toward all emerging technologies focused on in this research (see Appendix A, section III-IV). These emerging technologies include social networking sites (SNSs), mobile learning/devices (ML), digital games (DGs), augmented reality (AR), virtual assistants (VAs), wearable technologies (WTs), 3D printing, online language learning platforms (OLLPs), and massive open online courses (MOOCs). The third section consists of four multiple choice and matrix questions to examine learners' familiarity and proficiency with emerging technologies, their self-reported actual use, intentions to use these emerging technologies and perceptions of pedagogical advantages. In the following section, a total of four open-ended questions were used to elaborate more on learners' thoughts on using emerging technologies in language learning.

In the fifth section, there are a total of 38 modified items of the DTPB scale (see Appendix A, section V) with a series of 5-point Likert-scale responses (strongly agree to strongly disagree) to examine factors that influence language learners' intentions to use certain emerging technologies in their future classrooms. Unlike the attitude scale in the third section, this section focuses on major emerging technologies which are listed as SNSs, DGs, and ML. Items focus on actual usage/behavior, behavioral intention, attitude (perceived usefulness, perceived ease of use, compatibility, fun/enjoyment, dependence), perceived behavioral control (self-efficacy, facilitative technology conditions, facilitative resources conditions), and subjective norms (teacher influence, peer influence, parents' influence).

In the last section of the survey, the respondents were asked whether they would be interested in volunteering for an interview and sharing their contact details to be contacted by the researcher (see Appendix A, section VI).

3.7.2. Interviews

The semi-structured interview questions have been developed based on the emerging technologies attitude and the DTPB constructs to further explore learners' survey results and gain additional insights into their responses (see Appendix B for guiding interview questions). As already mentioned above, recruitment for the interviews was done through an item in the survey, and participants were asked about their willingness to be contacted for an interview. Interviews lasted for approximately 20 minutes. The interviews were conducted in Turkish to help the participants express themselves better. The interviewees were chosen according to quota sampling in which the researcher decides on a quota for each category samples. Following the interviews, they were translated into Turkish transcribed by the researcher through an online tool named "Transcribe" to help with a detailed analysis of their content.

3.8. Data Analysis

In order to answer the first research question, TACI scores were analyzed based on a 9-point scale. As mentioned above, an individual with a low TACI score is very comfortable with innovation, while an individual with a high TACI score is not comfortable with innovation (Kim et al, 2013). TACI scores were used to reveal distribution of five categories of users, which further showed their willingness to use emerging technologies in their learning. Moreover, the knowledge of adopter categories helped understand the characteristics of learners that are significantly important in the diffusion of innovation.

The attitude scale followed by open-ended questions was used to address the second research question. The attitude scale data including familiarity, proficiency, self-reported actual use, intentions and benefits including demographics were analyzed through descriptive and inferential statistics in SPSS 22.0. All open-ended survey responses and interviews regarding the

second research question were analyzed using content analysis. Holsti (1969) emphasizes that a related application of content analysis, even when direct access to the subject poses no difficulty, is to develop an independent line of validation for data obtained through other methods. The investigator may check the results of the questionnaire or the interview data by comparing them with content analysis of the subjects' statements. He also reminds the investigator of the necessity to use his/her judgments in making decisions about the data even in the simplest and most mechanical forms of content analysis. Krippendorff (2004) emphasizes that analyzing texts in the contexts of their uses distinguishes content analysis from other methods of inquiry. In the light of this information, the data gathered from the open-ended survey responses and interviews were analyzed through content analysis upon their compilation, translation and transcription by the researcher.

To be able to answer the third research question, DTPB results were analyzed using path analysis to test the research hypotheses related to determining factors and to estimate the degree of the linkage between variables that determine intention to adopt three main emerging technologies (SNSs, ML, DGs). As stated by Sadaf (2013), path analysis, an extension of multiple regression, is concerned with the predictive ordering of variables (such as *X* causes *Y* and *Y* causes Z) to estimate the magnitude of the linkage between variables. Using path analysis pioneered by Wright, real effects can be isolated from spurious effects (Wright, 1921). Allen (1997) states that path analysis is an advanced statistical method used to discover the relative effects of dependent and independent variables (as cited in Sadaf et al, 2012). Moreover, Ajjan and Hartshorne (2008) state that path analysis allows the researcher to postulate the relationship among a set of variables using a theory and to show the strength of relationships between variables to interpret findings. The quantitative data in this research were analyzed through

utilizing a structural equation modeling (SEM) in STATA-SE 13.0 and employing path analysis with regression equations individually fitted on each path. STATA is a powerful tool offering very accurate results even with a large amount of data, and it is suggested over the other available statistical software packages especially for regression analyses. In this study, the alpha level of 0.05 has been used to evaluate statistical significance.

3.9. Summary and Overview of the Research Design

In this research study, a mixed-methods research design has been used in order to examine students' perceptions of themselves and emerging technologies in addition to an analysis of their intentions to use emerging technologies in their (future) classrooms. A survey was adapted and developed to collect quantitative data. In addition, qualitative interview data were collected to triangulate with quantitative survey data. The interview data were used as complementary to expand on and present more in-depth analysis of quantitative results. The survey and the structure of the interviews are further elaborated on as shown below. (see Table 3.5 for an overview of research questions, frameworks, data sources, and analysis procedures).

Table 3.5

Overview of Research Questions, Frameworks, Data Sources, & Analysis Procedures

Research Qs	Theory / Framework	Data Sources	Analysis Procedures
RQ1. How do language learners approach new technologies in general?	Innovation Diffusion Theory (Rogers, 2003) & Technology Adopter Category Index (Dugas, 2005)	-Technology Adopter Category Index Rubric -Semi structured interviews	QUAN: Frequencies and percentages, Independent t-test, Skewness & Kurtosis QUAL: Content analysis
RQ2. How do language learners perceive emerging technologies used for learning a foreign language based on: (a) familiarity and proficiency with emerging technologies? (b) actual use of emerging technologies to supplement in-class learning? (c) intentions to use emerging technologies to learn a language in the future? (d) benefits/drawbacks of using emerging technologies in in-class learning?		-Attitude scale data (single & multiple response questions) -Open ended survey items -Semi structured interviews	QUAN: Descriptive statistics: Frequencies and percentages QUAL: Content analysis
RQ3. What factors best predict language learners' intentions to use emerging technologies?	The Adapted Decomposed Theory of Planned Behavior (Adapted from Taylor&Todd, 1995)	-Adapted DTPB scale -Open ended survey questions -Semi structured interviews	QUAN: Path Analysis (Multiple Regression) QUAL: Content analysis

CHAPTER FOUR:

RESULTS AND ANALYSES

4.1. Overview of the Chapter

This chapter reports the results of the analyses conducted based on the procedures specified in Chapter 3. In this research study, a mixed-methods research design was used to examine students' perceptions of themselves and emerging technologies in addition to an analysis of their intentions to use emerging technologies in their (future) classrooms. Quantitative analyses constitute the basis of this study, yet qualitative analyses have also been utilized in answering some questions. A survey was adapted and developed to collect quantitative data. Besides, qualitative interview data were collected to triangulate quantitative survey data. The interview data were used as complementary to expand on and present more in-depth analysis of quantitative results.

In order to briefly present the significance and the scope of the research, the first research question in this study aimed to categorize students based on what they think about technology and how they adopt new technologies in general. The second research question aimed to explore EFL learners' perceptions of certain emerging technologies through matrix table survey items which were also supported and elaborated by several open ended survey items and interviews. The final research question's purpose was to investigate the dynamics or elements that trigger EFL learners' intentions to adopt three major technologies: social networking, mobile learning, and digital games.

In the current chapter, the results of the analyses are organized by research questions, first based on quantitative data, and then qualitative data in order to present the findings in a clear and coherent manner. However, before the results are presented, the chapter first, explores the demographics of the participants and their overall use of technologies in general.

4.1. Descriptive Analysis Regarding the Characteristics of the Participants

The instrument used to gather data related to the research questions in the current study were composed of four main parts. The first part was a demographic inventory designed to gather the demographic characteristics of the participants (see Appendix A, section I). The items in this section provided data about participants' gender, university, major area of study, language proficiency levels, device ownership, comfort levels with computers and Internet technologies.

A total of 472 EFL learners (n=472) responded to the survey. As shown in Table 4.1, 56% of the participants (n=263) were from a private university, while 44% (n=209) were from a public university. As for the distribution based on gender, 54% of the participants (n=253) were male, while 46% (n=219) were female students. Based on the overall involvement in this research, there was an equal distribution with regard to gender and the university enrolled. The only information to underline here is that the involvement of female participants from the private university (n=148) is quite high when compared with the total number of female participants from the public university (n=71). In addition, gender-based distribution of the participants enrolled at the public university was not equally dispersed unlike the overall distribution. 66% of the participants (n=138) enrolled at the public university were male, while only 34% (n=71) were female participants.

As for participants' major area of study gathered via an open-ended survey item, 50% of the participants (n=233) were enrolled in engineering programs, while the rest was studying architecture, finance, humanities, medicine and education.

Table 4.1

The Participants Based on Gender and the University Enrolled

			What is your university?		
			University (Private)	**University (Public)**	**TOTAL**
What is your gender?	**Male**	N	115	138	253
		Row %	45%	55%	100%
		Column%	44%	66%	54%
	Female	N	148	71	219
		Row %	68%	32%	100%
		Column%	56%	34%	46%
	TOTAL	N	263	209	472
		Row %	56%	44%	100%
		Column%	100%	100%	100%

As part of the demographic inventory, the participants were asked about the devices or gadgets they own, and of all the responses gathered from the participants (n=472), as shown in Table 4.2, 90% of them (n=426) reported having smart phones. Laptop computers were owned by 79% of the respondents (n=374), which is quite a high number when compared with desktop computer owners which constituted only 29% of all responses. There were also participants who reported having tablet computers, and they were 41% (n=41) of the total sample. Besides, there were participants owning phablets (n=45), basic phones (n=31) and smart watches (n=23) at the time of this research, but they only represented 22% of the whole group of participants. It is quite possible that the number of smart watch owners might increase, but it was still a very new technology at the time when the research was carried out.

Table 4.2

The Participants' Ownership of Devices/Gadgets

Answer	% Bars	Response	%
Smart phone (screen size: ~5 inches and below)		426	90%
Laptop computer (netbook, ultra book or regular)		374	79%
Tablet (screen size: ~7 inches and above)		194	41%
Portable music player		136	29%
Desktop computer		136	29%
Phablet (screen size: ~5.1 - 6.9 inches)		45	10%
Basic phone		31	7%
Other		28	6%
Smart watch		23	5%
Total Responses		472	100%

The participants were also asked about their level of language proficiency (see Table 4.3), and based on the responses, there seems to be an equal distribution among different language proficiency levels except for the advanced level of students who only constituted 2% of the total sample (n=10). In addition, the largest group of participants were 'pre-intermediate' students who were 30% of the sample population (n=143) followed by 'beginner/elementary' level representing 25% of the participants (n=119) and almost equally represented (21-22%) 'intermediate' (n=101) and 'upper-intermediate' students (n=99).

Table 4.3

The Participants Based on their Level of Language Proficiency

#	Answer	% Bars	Response	%
1	Beginner/Elementary (A1)		119	25%
2	Pre-intermediate (A2)		143	30%
3	Intermediate (B1)		101	22%
4	High/Upper-intermediate (B2)		99	21%
5	Advanced (C1-C2)		10	2%
	Total		472	100%

Since the research is mainly about EFL learners' attitude toward technologies, they were also asked about their comfort levels with computers (see Table 4.4) and Internet technologies (see Table 4.5) in general. Based on the overall results, the responses for both of these survey items were quite similar especially for response sets at both ends of the scale. The participants who reported being 'not at all comfortable' with computers (n=12) and with using Internet technologies (n=12) constituted only 3% percent of all the responses, while the participants having reported being 'very comfortable' with computers (n=84) and with using Internet technologies (n=86) constituted 18% of the sample. In this research, the students who were fairly comfortable with computers (n=196) and with using Internet technologies (n=209) outnumbered the ones who were a little comfortable with computers (n=180) and with using Internet technologies (n=165).

Table 4.4

The Participants Based on their Comfort Levels with Computers

#	Answer	% Bars	Response	%
1	Not at all comfortable		12	3%
2	A little comfortable		180	38%
3	Fairly comfortable		196	41%
4	Very comfortable		84	18%
	Total		472	100%

Table 4.5

The Participants Based on their Comfort Levels with Using Internet Technologies

#	Answer	% Bars	Response	%
1	Not at all comfortable		12	3%
2	A little comfortable		165	35%
3	Fairly comfortable		209	44%
4	Very comfortable		86	18%
	Total		472	100%

Regarding demographic inventory items inquiring about the participants' comfort levels with computer and Internet technologies, compared with the number of participants having concerns about their confidence with technologies, the group who felt more confident seems to hold the majority of the sample. The total number of participants who were either 'fairly comfortable' or 'very comfortable' with computers and Internet technologies constituted successively 59 and 62% of the total number of respondents compared with the respondents stating that they were either 'a little' or 'not at all comfortable', which showed a positive inclination and self-confidence with technologies among the participants of this research. In addition, responses regarding comfort levels with computers and Internet technologies were cross tabulated (see Table 4.6) to analyze further related associations. The results showed that gender had a significant effect on the participants' comfort levels with computers, c^2 (3, N = 472) = 15.37, p = .001. As it is obvious in Table 4.6, the percentage of males who were either 'not at all' or 'a little comfortable' with computers is 33% (n=84), while the percentage of females who seemed to lack confidence with computers was 49% (n=108). On the other hand, 67% of males (n=169) in this research were either 'fairly' or 'very comfortable' with computers, while this was just 51% (n=111) for the female participants.

The results showed that gender had a significant effect on the respondents' comfort levels with using Internet technologies, c^2 (3, N = 472) = 13.31, p = .004. As can be seen in Table 4.6, the percentage of males being either 'not at all' or 'a little comfortable' with using Internet technologies was 31% (n=79), while the percentage of females who seem to lack confidence with computers was 45% (n=98). On the other hand, 69% of males (n=174) in this research were either 'fairly' or 'very comfortable' with computers, while this was 55% (n=121) for the female participants.

Table 4.6

Cross Tabulation of Comfort Levels with Gender

			What is your comfort level with…									
			Computers?					Internet technologies?				
			Not at all comfortable	A little comfortable	Fairly comfortable	Very comfortable	TOTAL	Not at all comfortable	A little comfortable	Fairly comfortable	Very comfortable	TOTAL
What is your gender?	Male	N	5	79	112	57	253	4	75	116	58	253
		Row %	2%	31%	44%	23%	100%	2%	29%	46%	23%	100%
		Column%	42%	44%	57%	68%	54%	33%	45%	56%	67%	54%
	Female	N	7	101	84	27	219	8	90	93	28	219
		Row %	3%	46%	39%	12%	100%	4%	41%	42%	13%	100%
		Column%	58%	56%	43%	32%	46%	67%	55%	45%	33%	46%
	TOTAL	N	12	180	196	84	472	12	165	209	86	472
		Row %	3%	38%	41%	18%	100%	3%	35%	44%	18%	100%
		Column%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

4.2. Quantitative Data

Having presented the demographic data regarding participants involved in this research, the next section dwells on the results gathered via quantitative survey items, which will be followed by the findings of qualitative data collected through open-ended survey items and interviews. In both sections, the results are portrayed based on each research question and presented in the order research questions appear in the methodology chapter.

4.2.1. Research Question 1

How do language learners approach new technologies in general?

This research question was examined and tabulated based on the data gathered through the survey and also the interview. The Technology Adopter Category Index (TACI) Rubric provided the quantitative data to group participants based on their self-reported responses, and the interviews helped elaborate on learners' own approach and how they adopt new technologies

in general. While the quantitative results are presented in this section, the interview results follow the quantitative analyses of all three research questions.

As discussed in the methodology chapter, this research study focuses on several specific emerging technologies; however, what was underlined in this question is that participants were asked to consider any new technologies they use in general, not just educational or certain emerging technologies. The rubric for Technology Adopter Category Index (TACI) was adapted and used as part of the overall survey tool and students were asked to select the best option among nine different adopter categories to address this research question. In order to answer the first research question, TACI scores were tabulated based on a 9-point scale. As mentioned above, an individual with a low TACI score is very comfortable with innovation, while an individual with a high TACI score is not comfortable with innovation (Kim et al, 2013). Table 4.7 shows how all the participants (n=467; missing n=5) who were distributed based on their TACI scores.

Table 4.7

Participants Based on Technology Adopter Category Index Rubric

TACI Rubric Items	% Bars	Response	%
1. I tend to adopt new technology as soon as it is available to me. My interest lies more with the technology itself than with its application to specific problems. (INNOVATOR)*		30	6%
2. In between 1 and 3 (EARLY ADOPTER)		75	16%
3. I explore new technologies for their potential to bring about improvements. I am willing to try new things, and am not averse to occasional failure. (EARLY ADOPTER)		59	13%
4. In between 3 and 5 (EARLY MAJORITY)		76	16%
5. I adopt a "wait and see" attitude toward new technology, and want examples of close-to-home successes before adopting. I want to see value in an innovation before adopting it. (EARLY MAJORITY)		114	24%
6. In between 5 and 7 (LATE MAJORITY)		52	11%
7. I accept new technology later in the game, once the technology has become established among the majority. (LATE MAJORITY)		32	7%
8. In between 7 and 9 (LAGGARD)		14	3%
9. I am usually not interested in adopting new technology. (LAGGARD)		15	3%
Total		467	100%

* The category names in parentheses were not provided in distributed surveys.

According to Rogers (2003), when a new technology is available to a group, it will be adopted first by the innovators, followed in turn by the early adopters, early majority, and finally late majority. The remaining members of the group, the laggards, may or may not adopt it at all. Furthermore, each adopter category consists of individuals with a similar degree of innovativeness, with the innovators having the highest degree of innovativeness, and the laggards

having the lowest degree of innovativeness (Dugas, 2005). Therefore, since the scale was originally out of 9 points, the responses were recoded to reflect the total number of EFL students based on five main groups. In order to reflect the group categories more accurately, the scores were also inverted so that innovators were represented with the highest score and the laggards with the lowest score. Based on this alteration (see Table 4.8), the percentage of participants in early majority category was 40,7 (n=190) making this category the largest group of the research, while early adopters represented 28.7% (n=134) of the total sample. These two main categories were followed by late majority represented by 18% (n=84) of the sample. Finally, innovators represented by 6.4% (n=30) and laggards constituting 6.2% (29) of the sample were the groups at the two far end of the distribution chart.

Table 4.8

Participants Based on Technology Adopter Category Index

Adopter Categories	% Bars	Response	%
1. Laggards		29	6.2%
2. Late Majority		84	18%
3. Early Majority		190	40.7%
4. Early Adopters		134	28.7%
5. Innovators		30	6.4%
Total		467	100%

As detailed in previous chapters, Rogers' Innovation and Diffusion Theory (IDT) dictates that the diffusion process is represented by an s-shaped curve and consists of five normally distributed groups of adopters as also expressed above (Hall & Elliott, 2003). Thus, the adopter categories are a means of convenience in describing the members of a system (Dugas, 2005). In

this study, the TACI Rubric was adapted and designed to determine the adoption group into which an EFL learner would fit. Thus, the results provided an indication of the degree of innovativeness of the research sample. In line with Rogers' IDT and the previous studies in the literature (Dugas, 2005; Hall & Elliott, 2003), the sample in this study were normally distributed based on their TACI scores. In order to analyze whether the distribution of adopter categories is normal or not, skewness and kurtosis values were calculated. As shown in Table 4.9, the skewness value is -.211 (SE= .113), and the kurtosis value is -.271 (SE= .225). Skewness and kurtosis values within the range of +/-2 (SE) are generally considered normal, and if skewness is between −½ and +½, the distribution is considered "approximately symmetric" (Bulmer, 2012). Based on the latter rule of thumb, with a skewness of -0.211 (SE= .113) and kurtosis value of -0.271 (SE= .225), the sample data for EFL learners' TACI scores were approximately symmetric.

Table 4.9

Coefficients of Skewness & Kurtosis Based on TACI Distribution

	N	Min.	Max.	M	SD	Skewness		Kurtosis	
							SE		SE
TACI Score	467	1	9	3.11	.981	-.211	.113	-.271	.225
Valid N	467								
Missing N	5	(*Not included in calculations*)							

The findings confirm Rogers' IDT and his claims that, like many other human traits, such as height, weight, or intelligence, innovativeness has been found to be normally distributed and can be represented by a bell-shaped curve. Therefore, it can be concluded that innovativeness and how EFL learners approach adopting new technologies in general seems to be normally distributed regardless of their gender, academic background or whether they are considered

"digital natives" or not. Nonetheless there might be statistical differences among EFL learners' approach in adopting new technologies even though the distribution is normally represented by a bell-shaped curve for the entire sample or population. However, the results of an independent-samples t-test conducted to compare TACI scores in males and females showed that there was no significant effect neither for gender, $t(465) = 1.52$, $p = .129$; d=.141, nor for the university that the participants were enrolled $t(465) = 0.774$, $p = .439$; d=.071 (see Table 4.10 & Table 4.11). The effect sizes for the analysis of TACI scores compared to gender (d=.141), and the university that the participants were enrolled (d=.071) was found to be small based on Cohen's (1988) convention.

Table 4.10

Independent Samples T-Test for Gender and TACI scores

		Levene's Test for Equality of Var.		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Differ.	Std. Err Differ.	95% Confidence Interval of the Difference	
									Lower	Upper
TACI Levels	Equal variances assumed	2.351	.126	1.521	465	.129	.138	.091	-.040	.317

Table 4.11

Independent Samples T-Test for University Enrolled and TACI scores

		Levene's Test for Equality of Var.		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Differ.	Std. Err Differ.	95% Confidence Interval of the Difference	
									Lower	Upper
TACI Levels	Equal variances assumed	.163	.686	.774	465	.439	.71	.091	-.109	.250

4.2.2. Research Question 2

How do language learners perceive emerging technologies used for learning a foreign language?

This research question aimed to explore EFL learners' perceptions of certain emerging technologies based on four distinct aspects: (1) familiarity with or proficiency in use of listed emerging technologies, (2) participants' actual use of emerging technologies, (3) EFL learners' intentions to use given emerging technologies, and (4) benefits and drawbacks of using given emerging technologies. This was achieved through matrix table survey items which were also supported and elaborated by several open ended survey items.

Unlike the previous research question, the second research question focused on only listed emerging technologies rather than technologies in general. As mentioned above, the question had four main aspects, and the first aspect was about the extent to which EFL learners were familiar with and proficient in three major technologies which were social networking sites (SNSs), mobile devices (MDs) and digital games in addition to other emerging technologies such as augmented reality, wearable technologies, virtual assistants, massive online open courses, 3D printing and online language learning platforms. Among all the listed technologies focused in this research question, as Table 4.12 indicates, social networking sites (SNSs) and mobile devices (MDs) seemed to be two of the most familiar digital tools for a considerable number of EFL students in this research. SNSs were the only technology in which 43.9% of the participants (n=206) reported being proficient, which was followed by MDs in which 21.9% of the sample (n=102) was proficient. Taking into account these two technologies considered to be among major technologies in this study, almost all of the participants reported using SNS either as a novice (10%, n=47), competent (43.9%, n=206), or as a proficient user (43.9%, n=206, M=4.3,

SD=0.7). The participants were also quite familiar with mobile devices, and reported adopting MDs as a novice (18.9%, n=88), competent (58%, n=272), and as a proficient user (21.8%, n=102, M=4.0, SD=0.7). Furthermore, respondents stated that they were also quite familiar with and might be using digital games (90.2%, n=423, M=3.3, SD=1.2) as another major technology and virtual assistants (92.7%, n=435, M=3.1, SD=1.0) as an example of minor emerging technologies. On the other hand, emerging technologies such as AR, WTs, 3D printing, OLLPs and MOOCs were four of the listed technologies that the participants were the least familiar with, and a total of more than fifty percent of the sample stated that they neither knew nor used these technologies. Taking into account the fact that some of these technologies, especially the ones like AR, WTs, 3D printing, are listed as technologies that could have a large impact on teaching and learning in Higher Education in at most 2-3 years' time by the New Media Consortium's Horizon Reports, the results seemed unforeseen. Considering the total number of participants who reported having no idea at all (42%, n=197) and participants who never used MOOCs (38.6%, n=181) even if they knew it at the time of this research, the results seemed quite overwhelming since MOOCs are actually quite popular around the world even among top tier universities and since MOOCs were shown among technologies that would be adopted in at most a year by the NMC Horizon Report in 2013 (see Table 3.1).

Table 4.12

Familiarity with or Proficiency in Use of Given Emerging Technologies

	Question: 1. Please list your level of proficiency with the following emerging technologies.	Never know %	Never use %	Novice %	Competent %	Proficient %	Total Responses	Mean	Std. Dev.
1	Social Networking (Facebook, Twitter, Instagram)	0.2	2.0	10.0	43.9	43.9	470	4.3	0.7
2	Mobile Devices/Systems (iPhone, Android, iOS, Nexus)	0.5	0.9	18.9	58.0	21.8	470	4.0	0.7
3	Digital Games (WOW, Minecraft, GTA, CoD, PES, NFS)	9.8	15.9	31.6	24.3	18.4	470	3.3	1.2
4	Augmented Reality	38.2	20.0	26.1	12.5	3.2	470	2.2	1.2
5	Virtual Assistants (Siri, S-Voice, Google Now, Cortana, Echo)	7.3	19.3	37.5	28.2	7.7	470	3.1	1.0
6	Wearable Technologies (Google Glass, Fitbit, Apple Watch, Samsung Gear)	14.8	43.9	23.2	14.1	4.1	470	2.5	1.0
7	3D Printing	17.3	42.3	27.3	9.8	3.4	470	2.4	1.0
8	Online Language Learning Platforms (Duolingo, Busuu, Babbel, Live Mocha)	21.8	35.2	26.4	13.4	3.2	470	2.4	1.1
9	Massive Online Open Courses (MOOCs)	42.0	38.6	13.6	5.0	0.7	470	1.8	0.9

Another focus of the second research question was EFL learners' actual use of the given technologies. SNSs and MDs were reported to be two of the most extensively used technologies by the sample. While only three percent of the participants (n=14) reported that they did not use mobile devices (MDs), 11.1% did not use social networking sites (SNSs) at the time when this research was conducted (see Table 4.13). Referring back to the demographic data that 90% of the sample had smart phones, these results seemed quite expected, or it might be the case that they had the means to use them, but they might not be intentionally using these tools. On the other hand, while digital games (DGs) were among the technologies that the participants were quite

familiar with, 44.3% (n=208) stated that they did not use DGs. Nevertheless, since the questions asked about specifically using these technologies to improve EFL learners' in-class learning, it is possible that they used these technologies in general but not necessarily for their in-class learning processes. In parallel with the results outlined in the previous section, augmented reality (AR) was seen among the technologies that could be adopted by a large portion of higher education institutions in 2-3 years' time, a very considerable number of students indicated that they did not use AR (73.6%, n=354, M=1.4, SD=0.7), wearable technologies (83.4%, n=391, M=1.3, SD=0.7), 3D printing (84.1%, n=395, M=1.2, SD=0.6), or MOOCs (80.5%, n=378, M=1.3, SD=0.6) to supplement their in-class learning at the time of this research. On the other hand, the percentage of EFL learners who either frequently or always used their mobile devices was very high and it was 81.9% of the participants who reported using their MDs at least frequently to improve their in-class learning, which meant almost all smart phone users made use of their MDs for their learning processes. Finally, unlike other minor emerging technologies, it is quite peculiar that 58.6% of the participants (n=275) reported that they used virtual assistants (VAs) to help with their in-class learning, and this ratio seems similar to how DGs were used by EFL learners to support their in-class learning (see Table 4.13).

Table 4.13

Actual Use of Given Emerging Technologies

	Question: 2. To what extent do you use the following emerging technologies to supplement/improve your in-class learning?	Don't use %	Use occasionally %	Frequently use %	Always use %	Total Responses	Mean	Std. Dev.
1	Social Networking (SNSs)	11.1	35.7	27.5	25.7	470	2.7	1.0
2	Mobile Devices/Systems (MDs)	3.0	15.2	40.5	41.4	470	3.2	0.8
3	Digital Games (DGs)	44.3	28.6	15.5	11.6	470	1.9	1.0
4	Augmented Reality (AR)	73.6	18.2	6.4	1.8	470	1.4	0.7
5	Virtual Assistants (VAs)	41.4	42.7	10.9	5.0	470	1.8	0.8
6	Wearable Technologies (WTs)	83.4	9.8	3.9	3.0	470	1.3	0.7
7	3D Printing	84.1	11.1	3.0	1.8	470	1.2	0.6
8	Online Language Learning Platforms (OLLPs)	58.4	29.3	10.0	2.3	470	1.6	0.8
9	Massive Online Open Courses (MOOCs)	80.5	13.0	4.5	2.0	470	1.3	0.6

As another aspect of the second research question, in terms of EFL learners' intentions to use listed emerging technologies, more than half of the participants reported planning to use technologies such as SNSs (n=321), mobile devices (n=383), DGs (n=240), and OLLPs (n=267), and social networking (n = 70) in order to learn or practice a language in the future (see Table 4.14). Comparing with the previous survey item asking about EFL learners' actual use of listed technologies, as can also be seen in Table 4.14, there seemed to be an obvious increase in percentages of the participants who reported planning to use technologies in their future language learning practices especially in terms of tools like rather minor emerging technologies such as MOOCs, OLLPs, 3D printing, WTs, and AR.

Table 4.14

Intentions to Use Given Emerging Technologies

	Question: 3. How likely is it that you will use of the following types of emerging technologies to learn/practice a language in the future?	Highly Unlikely %	Unlikely %	Undecided %	Likely %	Highly Likely %	Total Responses	Mean	Std. Dev.
1	Social Networking (SNSs)	5.2	8.4	18.0	42.5	25.9	470	3.8	1.0
2	Mobile Devices/Systems (MDs)	3.9	3.6	10.9	43.0	38.6	470	4.1	0.8
3	Digital Games (DGs)	15.7	10.7	22.5	30.0	21.1	470	3.3	1.0
4	Augmented Reality (AR)	22.5	18.0	35.2	18.2	6.1	470	2.7	0.7
5	Virtual Assistants (VAs)	15.0	13.2	29.1	31.4	11.4	470	3.1	0.8
6	Wearable Technologies (WTs)	24.1	19.5	27.5	20.9	8.0	470	2.7	0.7
7	3D Printing	28.2	20.9	27.7	15.7	7.5	470	2.5	0.6
8	Online Language Learning Platforms (OLLPs)	12.5	10.2	20.5	30.5	26.4	470	3.5	0.8
9	Massive Online Open Courses (MOOCs)	19.1	12.3	24.5	27.7	16.4	470	3.1	0.6

Finally, the emphasis of the fourth and the last aspect of the second research question was to examine EFL learners' perceptions of the benefits of using the given emerging technologies to supplement their own in-class learning. The results revealed that the EFL learners thought that the use of different emerging technologies could provide students with numerous benefits (see Table 4.15). Participants viewed social networking sites (SNSs) as the most useful emerging technology among all other major and minor new technologies thanks to SNSs' potential to easily share any content and knowledge (74.9%), to improve interaction with other students (64.1%), to improve student-teacher interaction (51.8%), to improve student satisfaction with the course (41%), and to improve critical thinking with collaborative learning (41.9%). Likewise, the participants also viewed using mobile devices (MDs) as relatively useful in terms of easily sharing any content and knowledge (62%), improving interaction with other students (51.9%),

and to improve student-teacher interaction (50.6%). This is quite reasonable when it is considered that students used their MDs to access their SNSs and communicate with others.

Table 4.15

Benefits of Using Given Emerging Technologies

Question: 4. What are in your opinion the advantages of using each of the following emerging technologies to supplement your in-class learning?		Improve student- teacher interaction %	Improve student learning %	Improve student satisfaction with the course %	Improve interaction with other students %	Improve student grades %	Improve student language ability %	Easy to use/share content knowledge %	Improve critical thinking with collaborative learning %	Total Responses (Count)	Total Respondents (N)
1	Social Networking (SNSs)	**51.8***	41.2	**41.0**	64.1	26.3	49.1	**74.9**	**41.9**	1,694	434
2	Mobile Devices/Systems (MDs)	50.6	50.4	36.7	**51.9**	29.1	45.6	**62.0**	32.7	1,418	395
3	Digital Games (DGs)	15.5	34.7	31.5	35.0	15.2	**53.3**	31.5	29.8	860	349
4	Augmented Reality (AR)	18.3	**33.5**	29.2	14.1	18.0	25.7	27.1	23.6	538	284
5	Virtual Assistants (VAs)	15.3	41.9	21.4	16.9	21.1	**49.2**	36.7	15.3	682	313
6	Wearable Technologies (WTs)	15.1	35.8	27.1	20.7	18.4	33.8	**36.8**	18.1	615	299
7	3D Printing	15.5	**34.9**	30.3	17.3	21.8	19.7	31.0	25.0	555	284
8	Online Language Learning Platforms (OLLPs)	27.7	**52.6**	39.6	33.0	**45.5**	**56.7**	45.2	28.3	1,055	321
9	Massive Online Open Courses (MOOCs)	28.9	48.5	33.8	29.7	37.2	**49.6**	42.5	32.3	805	266

Note. *The highest values for each row and column have been marked in bold for the ease of reading

Furthermore, online language learning platforms were considered as the most useful technology in terms of improving students learning (52.6%), improving students learning ability 56.7%), and improving student grades (45.5%). Finally, as seen in Table 4.15, considering the rest of other technologies focused in this research, DGs were perceived effective first in improving student language ability (53.3%), AR in improving students learning (33.5%), VAs in

improving student language ability (49.2%), WTs in easily sharing knowledge (36.8%), 3D printing in improving students learning (34.9%), and MOOCs in improving student language ability (49.6%) among all the benefits reported by participants.

4.2.3. Research Question 3

What factors best predict language learners' intentions to use emerging technologies?

The aim of the third and the final research question was to investigate the dynamics or elements that trigger EFL learners' intentions to adopt listed technologies with a focus on only three major emerging technologies: social networking, mobile learning, and digital games. The DTPB scale located at the end of the survey instrument was used by almost the entire sample (n=452) with some missing data from a relatively small group (n=20) who were not included in calculations (see Table 4.16 for the DTPB descriptive statistics).

Table 4.16

The DTPB Descriptive Statistics

DTPB Factors	N	Mean	α value	Std. Dev.
Behavioral Intention (BI)	452	2.00	.85	0.79
Attitude (A)	452	1.96	.92	0.75
Ease of Use (EOU)	452	2.02	.79	0.75
Perceived Usefulness (PU)	452	2.06	.81	0.71
Compatibility (C)	452	2.09	.87	0.79
Fun & Enjoyment (FE)	452	1.96	.89	0.82
Dependence (D)	452	2.66	.52	0.92
Subjective Norm (SN)	452	2.10	.80	0.71
Peer Influence (PI)	452	2.24	.81	0.86
Teacher Influence (TI)	452	2.19	.79	0.78
Parents' Influence (PSI)	452	2.20	.89	0.91
Perceived Behavioral Control (PBC)	452	2.04	.66	0.77
Facilitative Condition: Technology (FCT)	452	2.14	.78	0.76
Facilitative Condition: Resources (FCR)	452	1.86	.84	0.69
Self-efficacy (SE)	452	2.07	.96	0.79
Missing N	20			(*Not included in calculations*)

Table 4.17

Reliability Analysis of Each DTPB Construct

Construct	Item	α value
Behavioral Intention		0.85
BI1	I plan to use emerging technologies in my language learning experience this term and in the future	
BI2	I intend to use emerging technologies to improve my language skills	
Attitude		0.92
A1	Emerging technologies will be useful in my learning a language	
A2	Using emerging technologies is a good idea in language classrooms	
A3	Using emerging technologies in my language learning will make it more fun and enjoyable	
Ease of Use		0.79
EOU1	I feel that emerging technologies will be easy to use in language learning	
EOU2	I feel using emerging technologies would be clear and understandable	
EOU3	I feel it would be easy for me to become a competent learner at using emerging technologies	
Perceived Usefulness		0.81
PU1	I feel that using emerging technologies will help me learn more about the subject	
PU2	I feel that using emerging technologies will improve my satisfaction with the course	
PU3	I feel that using emerging technologies will improve my grades	
PU4	The advantage of using emerging technologies outweighs the disadvantages of not using it	
Compatibility		0.87
C1	Using emerging technologies are compatible with the way I learn	
C2	Using emerging technologies fit well with the way I will learn a language	
C3	Using emerging technologies will fit into my learning style	
Fun & Enjoyment		0.89
FE1	It will be fun to learn and practice a language with emerging technologies	
FE2	I enjoy using emerging technologies in my language learning	
Dependence		0.52
D1	I will not be able to learn a language without emerging technologies	
D2	Using emerging technologies will be an indispensable part of my language learning	
Subjective Norms		0.80
SN1	My peers will be using emerging technologies in their language classrooms	
SN2	My peers think I will benefit from using emerging technologies in my future language classrooms	
SN3	My teachers will think it is important I use emerging technologies in my language classrooms	
SN4	My parents will think it is important to use emerging technologies in my language classrooms	
Peer Influence		0.81
PI1	Peers who influence my behavior would think that I should use emerging technologies in learning a language	
PI2	Peers who are important to me would think that I should use emerging technologies in language classrooms	
Teacher Influence		0.79
TI1	My teacher, whom I will report to would think that I should use emerging technologies in the language classroom	
TI2	I will have to use emerging technologies in the classroom because my teachers will require it	
Parents' Influence		0.89
PSI1	My parents think that I should use emerging technologies in learning a language	
PSI2	My parents who are important to me think that I should use emerging technologies in my language classrooms	
Perceived Behavioral Control		0.66
PBC1	Using the emerging technologies is entirely within my control	
PBS2	I have the knowledge and ability to use emerging technologies	
Facilitating Condition: Technology		0.78
FCT1	Emerging technologies are compatible with the computer or other devices I will use in my language classroom	
FCT2	Emerging technologies will work properly together with other available technologies in the classroom	
Facilitating Conditions: Resources		0.84
FCR1	I will be able to use emerging technologies using any computer connected to the Internet	
FCR2	There will be other devices and computers available to use together with emerging technologies	
Self Efficacy		0.96
SE1	I would feel comfortable using emerging technologies	
SE2	I could easily use emerging technologies on my own	
SE3	I know enough to use emerging technologies	

END OF THE TABLE

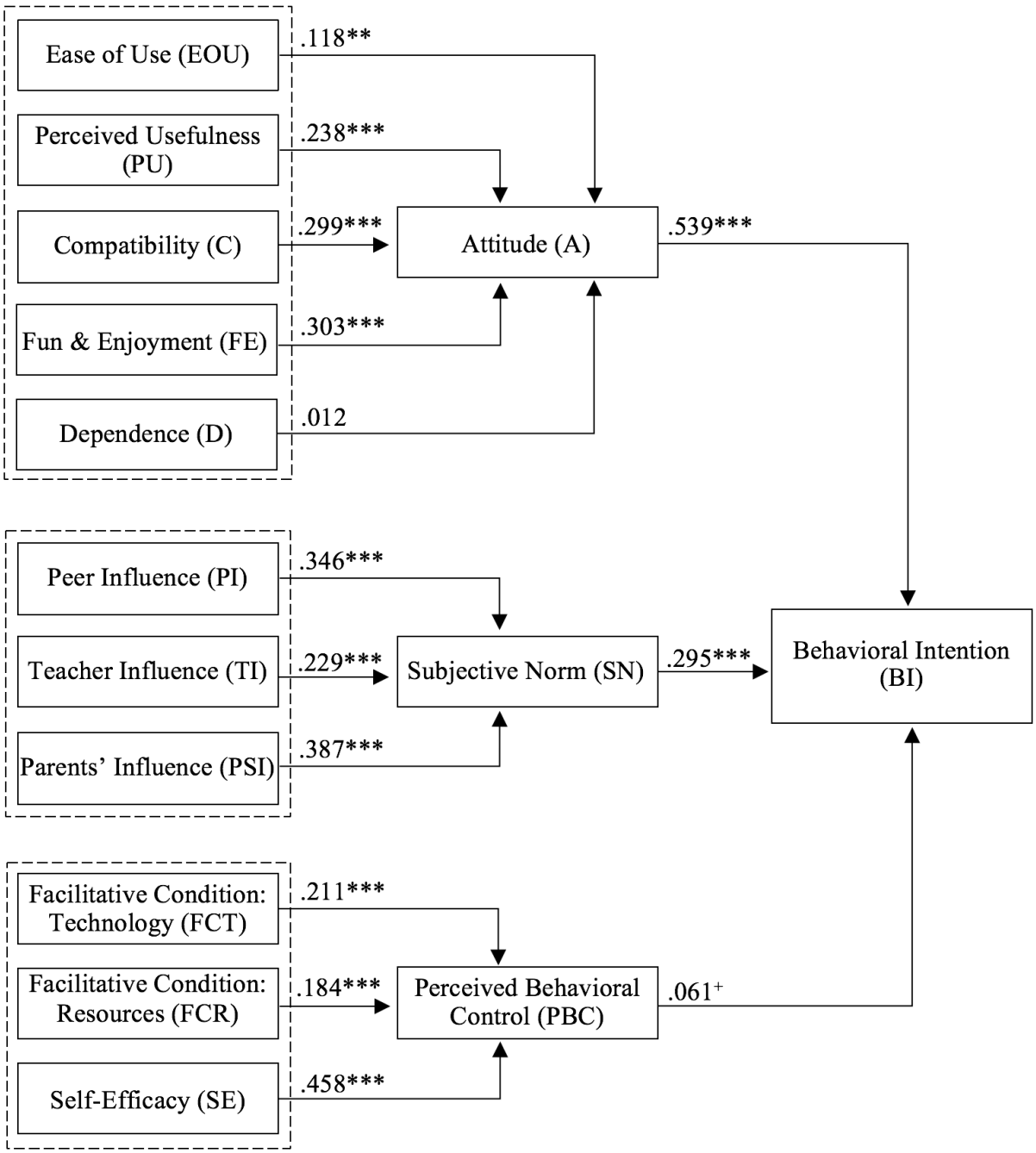
The adapted DTPB scale in this research is composed of a total of fifteen variables measured by 38 survey items. Reliability scores for each construct and all paralleling survey items are included in Table 4.17. Alpha coefficients indicated that all the variables except for two of them (dependence, α=.52; perceived behavioral control, α=.66) had a moderate or a high internal consistency with resulting values ranging from 0.78 to 0.96 (see Table 4.17).

Given the multivariate context of the variables involved in the study, path analysis models were used to test the relationships (Wright 1921). Using path analysis, it is quite likely to isolate real from spurious effects. Thus, path analysis is concerned with estimating the magnitude of the linkage between variables and these estimates were used to provide information regarding underlying causal processes (Hartshorne & Ajjan, 2009). The DTPB has always been a useful model for explaining variance in the adoption of different innovations. In this research, the adapted DTPB model with the inclusion of three new components or variables was useful for explaining as well as predicting much of the variance in EFL learners' use of three major emerging technologies in their language learning processes. Additionally, most paths in the model were statistically significant. Using the results of the path analysis (see Table 4.18), the findings regarding statistically significant relationships between the factors that influence EFL learners' intentions to use emerging technologies were presented (see Figure 4.1).

In the next section, regression results for each construct of the adapted DTPB model will be revealed and explained (see Table 4.18 and Figure 4.1). These constructs are behavioral intention (BI), attitude (A), subjective norm (SN), and perceived behavioral control (PBC), and they are presented next in the order they are listed here.

Figure 4.1

Path Analysis of Factors that Influence EFL Learners' Intentions to Use Emerging Technologies



Note. $^{+}p < 0.10$, $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Table 4.18

Path Analysis of Factors that Influence EFL Learners' Adoption of Emerging Technologies

Equation	R2 (adjusted R2)	Beta (t-scores)*
Behavior intention (BI)	0.674 (0.671)	
BI = SN + A + PBC		
Subjective Norm		0.295 (6.45)***
Attitude		0.539 (12.02)***
Perceived Behavioral Control		0.061 (1.68)+
Subjective norm (SN)	0.651 (0.648)	
SN = PI + TI + PSI		
Peer Influence		0.346 (8.71)***
Teacher Influence		0.229 (6.09)***
Parents' Influence		0.387 (10.11)***
Attitude (A)	0.787 (0.784)	
A = PU + EOU + C + FE + D		
Perceived Usefulness		0.238 (5.28)***
Ease of Use		0.118 (2.81)**
Compatibility		0.299 (6.27)***
Fun and Enjoyment		0.303 (6.88)***
Dependence		0.012 (0.41)
Perceived behavior control (PBC)	0.549 (0.546)	
PBC = SE + FCR + FCT		
Self Efficacy		0.458 (9.77)***
Facilitating Conditions: Resources		0.184 (4.12)***
Facilitating Conditions: Technology		0.211 (4.66)***

Note. Figures shown are beta coefficients, *t* values in parentheses.
$^{+}p < 0.10$
$^{*}p < 0.05$
$^{**}p < 0.01$
$^{***}p < 0.001$

4.2.3.1.Behavioral Intention

Regression results confirmed that the three factors combined—attitude, subjective norm, and perceived behavioral control—explained a significant variance (67.1%) in behavioral intention (adjusted *R*2). Path analysis results indicate that two factors, attitude (β = 0.539, *t* = 12.02) and subjective norm (β = 0.295, *t* = 6.45) had a significant effect on behavioral intention, with attitude having the greatest effect. Thus, not only the linkage between behavioral intention

and attitude, but also the linkage between behavioral intention and subjective norm were confirmed by path analysis findings ($p < 0.001$). In contrast, perceived behavior control ($\beta = 0.061$, $t = 1.68$) had no significant effect on behavioral intention ($p < 0.10$); therefore, the hypothesis regarding the linkage between behavioral intention and perceived behavioral control was not confirmed since the alpha level of 0.05 has been used to evaluate statistical significance in this research. These results imply that EFL learners' intentions to adopt emerging technologies for the purpose of learning a language are likely to be affected by their own attitudes and the influence of the people around them such as their peers, teachers or parents. On the other hand, perceived behavioral control as a determinant or predictor of behavioral intention does not seem to be as influential as the other two factors explained above.

4.2.3.2. Attitude

Attitude, as explained above and also in previous chapters, is the variable with the highest number of components in this research, and two more components (fun & enjoyment, and dependence) were added to the model in order to improve its explanatory power and better reflect the context of the sample. Regression results confirmed that the five factors combined—perceived usefulness, ease of use, compatibility, fun & enjoyment, and dependence—explained a significant variance (78.4%) in attitude (adjusted $R2$). Path analysis results indicate that three of the factors, perceived usefulness ($\beta = 0.238$, $t = 5.28$), compatibility ($\beta = 0.299$, $t = 6.27$), and fun & enjoyment ($\beta = 0.303$, $t = 6.88$) had a significant effect on attitude, with fun & enjoyment having the greatest effect ($p < 0.001$). The results also revealed that ease of use as another factor had a significant effect ($\beta = 0.118$, $t = 2.81$) on attitude as well ($p < 0.01$). Thus, the statistical linkage and related hypotheses between attitude and all four factors revealed above —perceived usefulness, ease of use, compatibility, and fun & enjoyment—were confirmed by path analysis

results. In contrast, the path analysis results indicate that dependence (β = 0.012, *t* = 0.41), added to the DTPB model as a factor to explained users who may or may not voluntarily adopt emerging technologies and users who may simply adopt technologies because they feel addicted or dependent, had no significant effect on attitude. Therefore, the linkage between attitude and dependence was not confirmed statistically. These findings suggest that whether EFL learners consider emerging technologies as enjoyable, useful, easy to use, and compatible with their context or existing devices are likely to affect them when they decide to adopt these tools while learning a language. On the other hand, dependence as also defined above is not likely to have an effect on EFL learners' adoption of emerging technologies.

4.2.3.3. Subjective Norm

Regression results confirmed that the three factors combined—peer influence, teacher influence, and parents' influence —explained a significant variance (64.8%) in subjective norm (adjusted *R*2). Path analysis results indicate that all three of the factors, peer influence (β = 0.346, *t* = 8.71), teacher influence (β = 0.229, *t* = 6.09), and parents' influence (β = 0.387, *t* = 10.11) had a significant effect on attitude, with parents' influence having the greatest effect ($p < 0.001$). Thus, the linkage based on the DTPB model and hypotheses based on the relationship between subjective norm and all three factors—peer influence, teacher influence, and parents' influence— were confirmed by path analysis results. However, the individual determinants of parents' influence had the greatest effect on subjective norm. These results indicate that EFL learners who are learning English in intensive English programs in Turkey are likely to be influenced by their parents, peers and finally language teachers in that order when they adopt emerging technologies during their language learning processes.

4.2.3.4. Perceived Behavioral Control

Perceived behavioral control, defined as an individual's perception on how easy or difficult it is to carry out the behavior is referred to as perceived behavioral control (Ajzen, 1991), and it is closely related to the individual's perception of control over carrying out a behavior. As already revealed above, perceived behavioral control was found to have no significant effect on behavioral intention; however, regression results confirmed that the three sub-factors combined —self efficacy, facilitating resources conditions, and facilitating technology conditions— explained a significant variance (54.9%) in perceived behavioral control (adjusted *R2*). Path analysis results reveal that all three of the factors, self efficacy ($\beta = 0.458$, $t = 9.77$), facilitating resources conditions ($\beta = 0.184$, $t = 4.12$), and facilitating technology conditions ($\beta = 0.211$, $t = 4.66$) had a significant effect on perceived behavioral control, with self efficacy having the greatest effect ($p < 0.001$). As a result, the linkage based on the DTPB model and hypotheses based on the relationship between subjective norm and all three factors— self efficacy, facilitating resources conditions, and facilitating technology conditions— were confirmed by path analysis results. However, individual determinants of self efficacy had the greatest effect on perceived behavioral control. These findings imply that EFL learners' sense of self efficacy or, in other words, their perceived capabilities to perform a behavior is the most influential factor for them to adopt emerging technologies to learn a language. Besides, whether they have access to resources such as their socio economic status (SES) and availability of time, in addition to facilitating technology conditions can be among several other significant factors that trigger EFL learners to adopt certain emerging technologies.

4.2.4. Summary of the Quantitative Results

The aim of the first research question was to examine EFL learners' attitude toward technology and using digital tools in a general sense, and the findings gathered through the Technology Adopter Category Index (TACI) rubric indicate that, as with variables such as height, weight, or intelligence, innovativeness has been found to be normally distributed and can be represented by a bell-shaped curve. Accordingly, EFL learners in this research were found to be normally distributed among five different adopter categories (innovators, early adopters, early majority, late majority and laggards). The findings also revealed that there was no significant difference between the adopter categories and EFL learners' genders or the universities they were enrolled in (public or private).

The second research question mainly focused on three major emerging technologies— social networking sites (SNSs), mobile devices (MDs), and digital games (DGs)— and six more minor technologies —augmented reality (AR), virtual assistants (VAs), wearable technologies (WTs), 3D printing, online language learning platforms (OLLPs), and massively open online courses (MOOCs) in terms of EFL learners' familiarity, proficiency, actual or intentional use, and finally benefits regarding the listed emerging technologies. The findings revealed that EFL learners were mostly familiar with SNSs, MDs, DGs, and VAs. Moreover, they had a very high opinion of these technologies including the other listed technologies and these emerging technologies were thought to be quite useful for EFL learners in their language learning process. However, when it comes to using these technologies, the findings indicated that EFL learners were not very efficient in adopting and integrating these tools into their language learning process. However, the findings also revealed that EFL learners had intentions to use most of the

emerging technologies including even the ones that EFL learners reported having no idea about or familiarity with at all such as MOOCs, OLLPs, WTs, and even AR.

The third research question was one of the main foci of the research and the findings revealed significant evidence regarding the adoption of emerging technologies. The results indicate that EFL learners were significantly influenced by attitude and subjective norms in terms of their behavioral intentions to adopt emerging technologies. Perceived behavioral control was observed to be influential too, but only at a confidence level of 90% ($p < 0.10$). As for attitude, except for dependence, all the other four factors —usefulness, ease of use, compatibility, and fun and enjoyment— were revealed to be significantly influential in the adoption of emerging technologies by EFL learners. The findings also indicate that fun and enjoyment, which is a factor developed and added to the DTPB model, had the greatest influence on EFL learners' attitude to adopt listed technologies. As for subjective norms, the findings implied that EFL learners were significantly affected by their parents, peers, and teachers in their use of emerging technologies, and the parents had the greatest effect on subjective norm of EFL learners. Finally, even though perceived behavioral control did not have a significant effect on behavioral intention of EFL learners, the results suggest that EFL learners' sense of self efficacy, facilitating resources and facilitating technology conditions were significant determinants of EFL learners perceived behavioral control in their adoption of major emerging technologies.

4.3. Qualitative Data

Qualitative data were gathered through open-ended questions directed to the participants as part of the survey, and also through interviews held with a number of EFL participants selected based on quota sampling (n=8). The qualitative data was used to bolster and affirm what the quantitative data was showing. The interviews were held in Turkish and translated into

English by the researcher during transcription. Open-ended survey responses were both in Turkish and English depending on the language chosen by the participants. The responses were tabulated, color coded in terms of recurring themes and are presented here based on each research question, which will be discussed in the next section.

4.3.1. Research Question 1

The aim of the first research question was to investigate adopter categories based on EFL learners' attitude toward technologies in general. Interview data (n=8) revealed that all the participants had a positive attitude toward technology, but in line with the normal distribution observed as a result of survey data, the number of EFL learners who might adopt a digital tool whenever it is available to the consumers, or who wait till everyone except the individual himself adopts a certain technology was small, and participants were observed to have "positive feelings in general" toward technologies. Many of the participants stated that they "are quite interested in technology", however, they usually employ a "wait and see" strategy before they decide to own a specific technology. In line with the survey results, most interviewees fall under the adopter categories of early majority or late majority, and they reported that they had to adopt a specific technology because they needed to do so in order to catch up with their friends or the people around them. For instance, one interviewee who reported not having "a very strong relationship with technology" and who stated, "technology does not seem to be a must for me" explained how he made a transition at the fifth grade from a basic phone to a smart phone:

> I wanted to buy a mobile phone at that time because a lot of people around me were using smart phones. Whether it was smart or not was not a priority for me, but I just wanted to own a phone. There were the colorful smart phones by Nokia on the market. I thought that they did not attract my attention due to my wish to use the Internet. Facebook was quite popular then. I just wanted to be able to use it, meet new people, etc. As a result, I went through a transition and had a smart phone.

Interview results also revealed that participants might have different attitude and adopter categories based on the technology they decide to adopt. For instance, there was one interviewee who stated, “if it weren’t for technology, we would be nothing”, and he was usually the first in adopting and downloading movies on his computer as they were available; however, the same person expressed opinion on digital games by stating, “I have not played games with my computer four about 4-5 years”, and on social networking sites by saying, “a lot of friends of mine were using [Facebook], and I was against them.” Another interviewee who reported being cautious and doing “a careful market research” before adopting a tool like a smartphone was observed to fall under innovator adopter category in terms of digital games:

> When I was a kid, there was Gameboy and I was one of the first people to get my hands on one of them. I used to play games very often, indeed. The laptops were not very commonly in demand at that time. I do not personally like sitting still, and that was what I was doing since I spent a lot of time playing games. Then, the Gameboys were launched and I bought one once they were available in the store. I played with it so much that I broke it and bought another one. Apart from that, there was a computer game that I was very keen on. The game became available in Turkey and I bought it the moment when the sales people were putting the price tag on it. I completed the game in just two days, and I started playing it in its online platform, and there were only two other people playing the game online. It was the game based on James Cameron's Avatar.

Finally, interviews disclosed that adopter categories might interestingly change in the long run due to various reasons even if it is the same technology. To illustrate, the interviewee who said that he had been “using smartphones since the time they were first available in the market” explained how he changed his attitude toward them:

> They [smartphones] were quite attractive then, and they were already getting the attention of the whole world. Afterwards, since I could not control myself, and the phone started having a negative influence on me, I had to change my phone. Sometimes, an individual might not be able to control him/herself; therefore, I am using a downgraded version right now.

All in all, the interview data indicate that adopter categories might change from a person to another. Although most EFL learners fall under adopter categories such as early majority and late majority, findings indicate that they also fall under adopter categories like innovators and early adopters at one end of the distribution scale or laggards at the other end. In-depth interview data disclosed interesting findings that imply adopter categories might change in time or based on the technology that EFL learners decide to adopt, which will be discussed further in the next chapter.

4.3.2. Research Question 2

The main foci of the second research question were EFL learners' familiarity, proficiency, actual use, intentional use, benefits and finally drawbacks regarding listed emerging technologies.

4.3.2.1. Familiarity and Proficiency

First of all, as for EFL learners' familiarity with and proficiency in given emerging technologies, the interviews revealed similar findings to the survey results. The findings indicate that all the EFL learners who were interviewed reported that they were familiar with mobile devices (MDs) such as smartphones and most social networking sites (SNSs), with Facebook being the most familiar. However, there were only few who stated that they were familiar with other emerging technologies such as digital games (DGs), virtual assistants (VAs), wearable technologies (WTs), online language learning platforms (OLLPs) and online classes like MOOCs. When the interviewees were provided with explanations and examples regarding these technologies, it was observed that almost all of them were familiar with almost all the given emerging technologies. For instance, MOOCs were one of the least known technologies based on the survey responses, however, half of the interviewees stated that they were familiar with taking

online classes and some even preferred them over face-to-face classes. For example, one interviewee said that he had "no experience with any of the given minor emerging technologies"; however, when MOOCs were explained, he stated that he knew about those online classes that "about ten thousand people could participate in." The same interviewee clearly stated that he would prefer online classes to face-to-face classes.

When it comes to EFL learners' proficiency in given emerging technologies, almost all of them expressed their self-confidence and proficiency in both SNSs and MDs. In addition, mostly male interviewees stated their fondness of DGs as well. As for EFL learners' proficiency in emerging technologies, the interviewees were asked to rate themselves on a scale of one to ten, and the findings indicate that interviewees typically gave themselves a score of five. For instance, one interviewee who was observed to be quite familiar with most of the emerging technologies said:

> The technological tools I have been using are almost the same as the ones used by other people. Advancement in technology is always beyond us even if we are not familiar with most of them. Therefore, I would give a score of 4 for myself. [For me], 10 out of 10 can be given to the late owner of the Apple company, Steve Jobs. Those are the people who make technology go and move forward.

Another interviewee who gave himself a score of seven defined what ten meant for him by saying:

> A person with the score of 10 must be quite effective and can be someone who can figure out things easily. Personally, when I encounter a technological innovation, I might not know all the things about it in my first encounter. A person with 10/10 can do it very well and must be skilled at that.

4.3.2.2. Actual Use

Second, based on both quantitative and qualitative data, EFL learners seemed quite familiar with and proficient in given emerging technologies; however, similar to what was

implied by survey results, interviews indicate that only a limited number of EFL learners actually use these technologies to supplement in-class learning or their language learning processes. Besides, the ones who reported using some emerging technologies were only limited to some mobile apps and the Internet in general. For instance, an interviewee with a self-reported proficiency score of "6 out of 10" reported "following technology news" and being familiar with quite emerging technologies such as virtual reality and wearable technologies. The interviewee stated that he had "never felt like he could use some of the given emerging technologies for learning English." Another interviewee mentioned his use of emerging technologies with the following words:

> I think I have never used them for learning before. If you want, you can learn a few things as I mentioned before, or you can learn stuff from games or such while playing with technological tools. However, a person who is not motivated to learn might not learn a lot from them.

On the other hand, a few interviewees stated that they "downloaded apps to practice language skills", "watch movies and TV series in English with English subtitles", "use SNSs to meet native speakers and chat with people in English", "use dictionaries", and also "watch lectures" asynchronously to support language learning processes.

4.3.2.3. Intentional Use

As the third aspect focused by the second research question, EFL learners' intentions to use given emerging technologies in order to learn a language or support their learning processes in the future vary in terms of each technology, and the interviews imply that EFL learners were likely to use new technologies such as virtual reality or 3D technology with which they are not familiar, even though the findings also imply that interviewees were willing to use major emerging technologies like SNSs, or MDs which were reported to be among their familiar tools. For instance, three of the interviewees stated that they had no specific technology in mind to

adopt in the future, but they indicated that they might continue using technologies such as social media applications, instant messaging services such as WhatsApp and smartphones. To illustrate, the following excerpts by two interviewees might clarify what is actually meant at this point:

> Excerpt 1: In fact, there are not many technologies that I think I will use as part of my education or language learning. However, I am not even mentioning smart phones, office applications and computers since they are already a part of our lives today. Apart from that I have no such technologies in mind.
>
> Excerpt 2: No, there aren't any technologies that I think I will use in the future, but based on the situation we are in today, WhatsApp and similar tools are popular, and we use these tools like anybody else, unfortunately.

On the other hand, interviews also indicate that there were visionary or technologically ambitious EFL learners who would think that technology would be more integrated into their learning process making it "an indispensable part of learning for people" and learners who would be amazed by the idea that emerging technologies such as SNSs and DGs might be used more in language classes. For instance, an interviewee who would probably be called an innovator or early adopter described clearly of how some future EFL learners could use 3D technology and virtual reality:

> Let's imagine we are all in a room, and the setup could be simulated in a way to look like a situation in which a person is travelling abroad in order to teach how to talk to people in that kind of scenario. This might be a good idea, but whether it is necessary or not is a topic for a discussion because we might also do the same activity with a real teacher in a real classroom setting. The only difference is that when you speak to a teacher in class in Turkey, you already know that he can also speak Turkish, and I might use Turkish without even knowing about it. However, in a simulated or virtual environment, I might feel like I have to speak like the person in that virtual environment. For instance, this is usually the case in online games. You try to speak like the other players or characters do in a game. Moreover, online games might be good for language learning, and they are already used for that purpose. Then, it all depends on our imagination indeed, and open to development.

4.3.2.4. Benefits

Qualitative data gathered through both interviews and open-ended survey items support one another, and together they parallel quantitative data collected through mainly closed-ended survey items. Qualitative data also made an in-depth analysis of survey responses possible to describe EFL learners' opinion with regard to the advantages of using emerging technologies to supplement in-class learning. A thematic analysis of the qualitative data clustered around the following themes: (1) more opportunities to practice language skills, (2) value for making learning process more fun, enjoyable and interesting, and finally (3) easy and quick access to information.

More opportunities to practice language skills. Both open-ended survey responses (n=93) and interview data indicate that EFL learners had a very positive opinion of using emerging technologies in terms of the opportunities afforded by these technologies to practice language skills. For instance, a few responses read as follows:

> Excerpt 1: I have benefitted extensively especially from digital games. I have noticed that I have improved my vocabulary knowledge and learned a lot of expressions and phrases by simply talking to foreigners while playing the game and using English during the gameplay. Besides, an app that I downloaded from the App Store made it possible for me to review what I learned in class by taking notes and even recording voice during class, which helped me to compensate for what I missed in class and for what I had difficulty in learning.

> Excerpt 2: As a person who uses social networking sites at all times, the English language exists everywhere throughout all SNSs, which enables me to use and learn English. I simply follow people among whom there may be foreigners or native speakers as well. Hence, SNSs can be used both for sharing information and practicing a language.

> Excerpt 3: Thanks to friends I make and the opportunity to meet other people, it becomes possible to practice a language. It might certainly encourage people as well and develops motivation to learn a language. I don't think games will be beneficial for this. I also believe that apps installed on mobile devices for learning a foreign language

> or English can play a role in supporting one's learning. Besides, we usually access our social networking accounts through mobile devices, which makes the contribution of mobile devices to learning a language considerable.

As can be seen in the excerpts taken from open-ended survey responses, EFL learners are quite optimistic especially about major emerging technologies —social networking sites, digital games and mobile devices— which are commonly used by young people today. Furthermore, interviews also indicate how useful emerging technologies were for EFL learners. For instance, an interviewee listed different apps that were considered quite useful in terms of "vocabulary learning" and improving all other language skills such as "reading, listening, speaking, and writing." Another interviewee gave the example of Duolingo, which is an online language learning platform, and said:

> Duolingo is also very helpful because it reminds you of very basic vocabulary that you might have forgotten. It also helps with the practice and improvement of speaking, pronunciation, etc.

Value for making learning process more fun, enjoyable and interesting. Open-ended survey responses (n=82) and interview findings imply that EFL learners view the adoption of new technologies as a very enjoyable and interesting process. For instance, one respondent stated that the activity of learning is a boring concept for students in general, and he added, "it is quite possible to use these new technologies and improve learning experience." Another excerpt by a survey respondent reads as follows:

> They [emerging technologies] make it easy for us to learn new things, and we do not quit since we already know that it won't take a long time. On the contrary, while doing research about something we like or learn by playing games, we have a lot of fun and feel encouraged. We can deal with many things without the help of others.

In order to prove how fun learning with emerging technologies might be, one respondent recommended an app that can be installed on mobile devices. Users can choose what language

skills they need and at what level. The application then brings up several excerpts from various media sources such as movies, TV series or advertisements and users are expected to write down what they hear and test their vocabulary and grammar skills. Another student specifically named several emerging technologies—social networking sites, mobile devices, and digital games—and affirmed that the use of these technologies might prevent in-class sessions from becoming monotonous and boring. As mentioned above, interviews were quite successful in receiving in-depth data from the participants, and the findings indicate that using new technologies is fun, enjoyable and interesting. This is one of the most important benefits of emerging technologies. Accordingly, one student said:

> Yes, I am having fun indeed. If there were not technology, life would be more boring. Speaking with people all the time, even if s/he might be a very close friend, makes you exhausted. However, through the Internet or online tools, you can have more fun, be it a game or other things like sending videos. You can even see each other.

Another interviewee stated, "Besides technology, the feeling of trying something new is enjoyable and interesting for me." Another interviewee stated:

> It is absolutely more fun when technology is a part of our lessons. When we play online games, we usually have more fun. Listening to lectures all the time can cause headaches for me, and I feel like I need to relax at that moment. Then, those games help us have more fun.

Qualitative data presented many other instances of how fun, enjoyable, and interesting adopting new technologies could be for EFL learners, and factors such as interactivity, variety in communication channels, and glamor that especially design and appearance bring about are few of the reasons why using emerging technologies are considered fun and interesting. Fun and enjoyment will be analyzed further in the following sections as part of the DTPB factors to adopt emerging technologies.

Easy and quick access to information. Another recurring theme based on open-ended survey responses (n=75) and interview data was the idea that emerging technologies make access to information and sharing information quite easy and fast. Therefore, the findings suggest that EFL learners were encouraged to use emerging technologies for their own learning process or for these technologies to be integrated into classes. For example, one respondent stated that emerging technologies helped him "to reinforce what [he] had seen in class" and so made it possible to "easily learn subjects." Another stated that new technologies "help with the use of newly acquired information and with its development." In addition, these technologies help with "the reinforcement of what has been learnt by making it possible to spend some hands-on time on it." One more extract by a survey respondent regarding the benefits of using emerging technologies is as follows:

> These emerging technologies (SNSs, DGs, MDs) have several benefits in terms of processing information in my own context. For instance, when I am curious about something, I instantly use my smart phone to access information. I use social media and follow various sources to learn about actual news and events as much as I can. These technologies are quite useful for people today, I think.

Ease of use and speed in accessing and sharing information also came up as the highest-rated benefit made possible by social networking sites and mobile devices. Both survey responses and interview data confirmed this finding, and interview data revealed that EFL students think most emerging technologies help them to share anything they want and to access information very fast. A few of the interviewees gave specific examples of their use of smart phones and an instant messaging application which is very popular around the world. The application is named WhatsApp. One interviewee wrote:

> When smart phones started appearing on the market, there were not many tools to chat and talk with friends, and SMS was outdated. WhatsApp was easy to chat with and share

> images, audio recordings, and videos. Since doing all these things was easier with WhatsApp, I personally preferred it and I am still using it.

Almost all the interviewees mentioned their awareness of the advantages of emerging technologies. One of the most often cited advantages is accessing information with. Another interviewee who indeed was not very fond of social networking sites, admitted to their benefits and stated:

> Indeed, I am not a very strong supporter of SNSs. I only think that this is a need in our age, and we use them to reach people. As for me, I do not want to use it very often, but it looks like it is a must in our world today since we access all kinds of up-to-date information on SNSs very quickly and with ease, and information spreads through these channels. Therefore, the world has to use SNSs today. I also use SNSs because of this.

As mentioned above, the findings suggest that emerging technologies, especially social networking sites and mobile devices, were habitually used by EFL learners to access information since these channels were quicker and easier compared to traditional ways such as libraries, books, newspapers, etc.

4.3.2.5. Drawbacks

Although the closed-ended survey items did not ask about disadvantages or drawbacks caused by emerging technologies, qualitative data collected through an open-ended survey item revealed several drawbacks regarding the use of emerging technologies by EFL learners. Interview data also confirmed some of those drawbacks and the three most common disadvantages are listed and explained here in light of the qualitative data. Interestingly, one of the most common responses provided by participants (n=75) was that there were "no disadvantages or downsides produced by emerging technologies." In addition, a thematic analysis of the responses indicated the following drawbacks of emerging technologies: (1) inefficient use and waste of time, (2) distraction and lack of concentration, and (3) finally addiction and social isolation.

Inefficient use and waste of time. It is quite ironic that most of the participants in this research think that emerging technologies in general enable a very quick access to information with just one click, and therefore help students save a lot of time for other activities; however, a majority of the respondents and interviewees were also of the opinion that emerging technologies led them to waste their time or prevent them from using time efficiently. A great majority of survey respondents (n=85) affirmed that emerging technologies, especially "social networking sites and digital games", were one of the main reasons why EFL learners wasted their time and couldn't use it efficiently. As one of the respondents stated, "if the purpose of using technologies in class is not learning English, then it may be just a waste of time with only some fun and enjoyment in return." Qualitative data also indicate that EFL learners are already aware of the fact that technologies can waste learners' valuable time if not used consciously, as expressed by one of the survey respondents:

> Digital games are a portrayal of real life and inspired by instances of our lives. They give people great opportunities in terms of living in a fantasy world and doing things which might not be possible in real life by leading people to spend a considerable amount of time on them. An individual can learn best from an activity on which s/he spends most of his/her time, and this might have benefits; however, this can also overwhelm people and lead to a considerable waste of time.

In addition, interview data confirm that emerging technologies could cause a waste of time for EFL learners if not used smartly. Most interviewees admitted that emerging technologies can be either a time-saver or a waste of valuable time depending on how they are used. This was clearly expressed by one of the interviewees:

> One advantage of using technology is that you can access information in just a second. It saves a lot of time but unconscious use of technologies makes people lose their valuable time as well. Therefore, the time aspect is both an advantage and disadvantage for technologies. If we use technology very consciously we can save time, but if you are using technology unconsciously and if you are addicted to it, you can spend too much time on it.

Another interviewee emphasized that the use of emerging technologies such as digital games is "all about the human nature, and you always want more and the best, which certainly makes people lose too much time." As a result, qualitative data imply that EFL learners were already aware of the fact that the use of emerging technologies might turn out to be either an advantage or a disadvantage, but this does not necessarily mean that they always used technologies efficiently, which in return caused a considerable waste of time.

Distraction and lack of concentration. Distraction and lack of concentration while using emerging technologies were revealed to be among the most common downsides for EFL learners in this research. Based on qualitative data gathered through survey responses (n=64), the use of emerging technologies, as stated by one of the interviewees, could probably lead to "a gradual loss of concentration, and especially games were considered to be the highest ranking problem for the youth." Furthermore, survey participants underlined the fact that emerging technologies such as social networking sites, digital games and mobile devices are "quite attractive" for students, and it seems "really hard to focus on language learning activities" when technologies act like distractors for students. A respondent stated, "both social media tools and digital games increase the waste of time, while it decreases productivity." Interview data also paralleled survey responses in that emerging technologies could distract EFL learners and led into a drop in attention spans. For instance, one of the participants explained how his attention span was influenced negatively by emerging technologies such as social media tools and games. Due to the nature of social media platforms like Facebook, Twitter or even YouTube, which also acts like an interactive sharing platform, users are exposed to several posted videos, pictures and messages on their dashboards. As a result, as one of the students stated, "there is always a flow of various posts, and while a user is checking out a picture, video or a message posted on a

dashboard, he can easily get distracted, which has a dramatic effect on people's attention span." Yet, qualitative data suggest that EFL learners were aware of all these shortcomings, and this could be dealt with easily when they act consciously.

Addiction and social isolation. Finally, it is possible that many EFL learners or simply people in general can become easily addicted to emerging technologies, and become socially isolated while using these technologies. Although, this theme was not as common as the first two drawbacks expressed by survey respondents, there were several responses (n=23) that indicated that addiction and social isolation are a drawback. As stated by respondents, social media tools and games were among the technologies that could make students "anti-social" although this could be avoided when time is spent wisely. Smart devices were also given among reasons why students might spend time in closed areas rather than socializing and spending time outside with friends. Interview data also suggest that addiction could become an issue when it comes to EFL learners' use of emerging technologies:

> Addiction is an issue. For instance, when I buy a phone or an Apple watch or use Instagram, I might be dependent on it. Then, it might stop working and I would feel like I am desperate since I do most of the things by using these technologies. I think I would feel overwhelmed. This is an issue, I think.

Another interviewee stated, "One needs at least one of these technologies all the time. You can insert and use micro USBs with your smart phone. This is a sort of addiction." One final excerpt by one of the interviewees indicate how students were prone to this issue while using emerging technologies:

> I think people are quite dependent on SNSs and it is as if they live for SNSs. They have their phones with them all the time, and they take pictures around just to share on various social media sites. I think, they forget or miss living their own lives most of the time. There was even a commercial about this. I used to like SNSs a lot and I believe they make people dependent and prevent people from living as they wish. People with smart phones in their hands live for and are addicted to SNSs like Facebook and Snapchat.

As many respondents show, addiction and social isolation were among the main drawbacks of using emerging technologies in this research. Even if EFL learners might be aware of these issues, it seemed it was not always easy to avoid these issues since most of the participants agreed that using emerging technologies usually resulted in addiction especially among young people.

4.3.3. Research Question 3

The third and final research question aimed to investigate the dynamics or elements that trigger EFL learners' intentions to adopt listed technologies with a focus on only three major emerging technologies: social networking, mobile learning, and digital games. Quantitative data with path analysis results displayed several significant relationships in terms of different linkages between variables and most hypotheses were confirmed. The aim of qualitative data collected through open-ended survey responses in addition to interviews was to triangulate survey data collected through the adapted DTPB scale and provide more in-depth understanding of several variable functioning in the DTPB model. The findings of qualitative data will be presented in the next section in terms of three main DTPB variables—attitude, subjective norm, and perceived behavioral control.

4.3.3.1. Attitude

Attitude as one of the main predictors of behavioral intention is composed of five sub-factors—ease of use, perceived usefulness, compatibility, fun & enjoyment, and dependence—and qualitative data indicate it to be quite influential for EFL learners to decide to use three main emerging technologies—social networking sites, mobile devices, and digital games.

Ease of Use. A considerable number of survey respondents (n=23) underlined the importance of ease of use for an emerging technology to be adopted among other factors such as

"how the innovations are promoted, whether their usefulness has been proven, fun aspect, and ease of use". Besides, a few interviewees explained why they started using a certain emerging technology in their own lives, and the reason was reported to be the ease of use of that technology. For instance, one interviewee said, "I use it [WhatsApp] for several purposes; communication and such. You can even make calls via WhatsApp. Besides, there are class groups, and it is easy to share anything about different classes. It makes you to become more active." The findings, therefore, implied that a tool that was easy to use was the reason for the tool to be adopted by EFL learners.

Perceived Usefulness. Open-ended survey items indicate that most students (n=45) intend to adopt emerging technologies if these tools are considered useful for learning a language. For instance, one of the survey responses read, "I will use the tool if it could improve my grade, or if that is an application that could enable me to share my knowledge and opinions in an interactive way" which shows that a variety of functions can help an emerging technology to be adopted by EFL learners. A few of the interviewees also said that if a digital tool was useful for them, they would certainly adopt the tool and even enjoy using that specific tool. An excerpt by one of the interviewees clearly shows how usefulness might be significant in adoption:

> For instance, I do not want to use Facebook, and I think it is absolutely time-consuming, but it is the only platform where we can communicate with our friends at school. Student groups and different societies hold their communication through Facebook regarding announcements and news. Therefore, I think I have to use Facebook.

As part of the interviews, participants were also asked some retrospective questions about why they adopted a certain technology such as their smartphones, social media tools, or digital games, and the findings showed that EFL learners might adopt a tool when they feel a need such as "communicating with friends and family, participating online classes, preparing for the exams,

learning vocabulary, developing language skills and etc.", and when that specific technology is believed to meet that need.

Compatibility. Open-ended survey responses indicate that no direct response was observed to demonstrate that compatibility is important in adopting a new technology, however, as underlined by one of the interviewees, "considering a smart phone, I can come up with a few options to buy. Then, I think about their performance, system lag, or variety of applications available, and their compatibility." Compatibility seems to be very important in cases where a student buys a device for school or work, and whether the devices allows certain applications or software packages to be installed becomes a significant factor before adoption. Another excerpt which was also cited in a previous section in this chapter seems quite clear in terms of demonstrating how compatibility is essential in adopting a new technology:

> There were the colorful smart phones by Nokia on the market. I thought that they did not attract me due to my desire to use the Internet. Facebook was quite popular then. I just wanted to be able to use it, meet new people, etc. As a result, I went through a transition and had a smart phone.

Fun & enjoyment. Due to the fact that the research sample included mainly young people and teenagers, the open-ended survey responses and interview data indicate that fun and enjoyment became a very vital factor in adopting new technologies. Indeed, this component was special to this research and added to the DTPB model considering the profile of the research group, but it is quite possible that fun and enjoyment might become important predictors in behavioral intention considering different age groups as well. One of the survey responses reads, "I use all the applications that I will benefit from, not just the fun or enjoyable ones. However, I also would like to learn a subject in a very enjoyable way, and so products with a fun aspect mostly attract my attention." Interview findings also showed that fun and enjoyment are quite substantial either as a primary or a secondary factor for EFL learners to adopt certain emerging

technologies. One of the interviewees clearly stated that he wouldn't continue using a technology unless he is enjoying the process, which shows how much fun and enjoyment can be influential both in the short and long run. On the other hand, another interviewee said:

> At first, I would not consider how useful it is. Since I am already having fun, I think I could also learn something and use it for some time, like a week. Later on, when I notice that it is fun, but it is useless. I might stop using it.

This excerpt shows that fun and enjoyment were influential during the initial adoption of an innovation; however, it lost its influence in time and was replaced by some other factors. In brief, both quantitative and qualitative data indicate that fun and enjoyment were substantially influential in EFL learners' adoption of new technologies, and the inclusion of this factor into the existing DTPB model showed its effectiveness based on research findings.

Dependence. Dependence is a component added as a new variable to the DTPB model in this research considering the fact that a lot of people are dependent on or even addicted to several emerging technologies. Although quantitative data did not show dependence as a reliable and significant factor in predicting behavioral intention to adopt emerging technologies, participants shared their opinions as part of open-ended survey responses and interviews by also justifying what they meant. For instance, a survey respondent stated that he intended to adopt certain emerging technologies because "courses and class activities already became quite dependent on using various technologies." Likewise, interview data indicated that some EFL learners adopt new technologies or just keep using them since they feel dependent on and even addicted to these technologies. For example, a response by one of the interviewees can clarify what is meant by the connection between dependence and the intention to use new technologies:

> I think I'm getting addicted to my smartphone, and here is how I am addicted to it: since we have several social media accounts, everybody is so active and they are actively using these tools. Therefore, I feel like I have to check out the Internet or these social media accounts very often, and I believe this is a very serious waste of time.

As mentioned above, although dependence did not show up as a factor to adopt technologies based on quantitative results and open-ended survey items, almost half of the interviewees raised it during the interviews. For instance, as a response to a question whether participants feel dependent on a certain technology, one of the interviewees said:

> Smart phone maybe. Without my phone, I would not be able to do things I need to. I could not even wake up in the morning. There is not even an alarm clock right now at home although we had one in the past. For instance, when the battery dies, I am late for school.

Based on the interview data, it is possible that dependence as a factor to adopt or to keep using adopted technologies seemed to be influential on EFL learners' decisions to use emerging technologies; however, since neither quantitative data nor open-ended survey items confirmed this, it is not possible to claim that dependence had an obvious effect on EFL learners' adoption of emerging technologies. In line with this, there was also the other half of the interviewees who stated that they were not dependent on emerging technologies and dependence did not come among the top factors to influence their adoption.

4.3.3.2. Subjective Norm

Subjective norm as the second main predictor of behavioral intention is composed of three sub-factors—peer influence, teacher influence, and parents' influence— and qualitative data indicate it to be quite influential for EFL learners to decide to use three main emerging technologies—social networking sites, mobile devices, and digital games.

Peer influence. Quantitative data revealed that all sub-factors of subjective norm in the adapted DTPB model proved to be significantly influential with peer influence as the second best predictor of subjective norm. Based on the open-ended survey items, a very considerable number of respondents (n=127) underlined the significance of their peers as the groups or people who would influence their intentions to use emerging technologies. Open-ended survey items did not

reveal an in-depth explanation for this, but interview findings indicated that peers and social group were quite influential for EFL learners in their adoption of emerging technologies. Indeed, peers might have an influence in terms of EFL learners' intentions to adopt new technologies in several ways. First, peers are evidently important since they model the use of a certain technology. For instance, an interviewee stated, "my friends were using [Facebook], too and I was curious. You might call it like social pressure." Another interviewee explained why peers might be influential:

> I think friends can affect me a lot because we come together, and everyone is talking about, say, an app and we can discuss its pros and cons together and use the technology. [For instance,] My friends were using [Quizlet: an app to study vocabulary], and they told me about it, which later persuaded me to download and try it by myself.

Second, peers are important in terms of the adoption of emerging technologies such as social networking sites and digital games because it is usually with peers that EFL learners adopt and use these technologies. To illustrate, an interviewee said:

> I use only Facebook today and it is like everybody has normally two Facebook accounts. Therefore, I felt like I had to use it and then I attempted to take a break and not use it, but I had to communicate with some friends and reach them both in and outside the university since everybody has already SNS accounts. Hence, I have been using Facebook.

Finally, peers can be considered as competitors or rivals, and it is evident that EFL learners might intend to adopt emerging technologies just for the purpose of catching up with their peers and not falling behind. For example, the following excerpt might explain this relation in a clear fashion:

> I have a Facebook account, a Twitter account, and I also use WhatsApp as does everybody. Let me think about how it started. I don't use any of them actively, however, I don't want to fall behind my friends and I also want to share information with them.

As can be observed clearly, peers have a considerable influence on EFL learners' intentions to adopt emerging technologies due to several reasons. Even though there are also other learners who might be influenced more by other factors, the findings in this research revealed that peer influence had a significant impact on EFL learner's use of new technologies.

Teacher influence. A very high number of open-ended survey responses (n=145) revealed that teachers are the most influential factor for EFL learners to use merging technologies. Respondents stated, "teachers are the ones who decide on the content and activities in class, and they might influence language learners when they integrate technology into classes or when they model the use of certain emerging technologies." The following excerpts from the interviews clarify the ways teachers might influence learners in terms of the adoption of emerging technologies:

> Excerpt 1: If my teachers wanted to use technology in class, that would be a need for me to use and I would comfortably use the tool and enjoy using it if that is also useful for me. [For instance,] our teachers asked us to spend time on English outside the class, and I remember only this as a factor.
>
> Excerpt 2: [Teachers] can also suggest things and I think we should listen to their advice on this although I have not done so far. They always do encourage us to use technologies, but I don't remember any specific examples right now.

Parents' influence. Parents' influence as a predictor of subjective norm and so behavioral intentions did not exist in the original DTPB model (Taylor & Todd, 1995); however, it was added to the adapted DTPB scale and model taking into account the ages and background of EFL learners. Quantitative data showed that parents' influence in this research explained the highest variance in subjective norm and proved to have a significant effect on EFL learners' intentions to adopt emerging technologies. Nonetheless, only a few open-ended survey respondents (n=7) remembered parents as a factor to influence the adoption of emerging technologies. The reason might be that parents' influence is mostly indirect in the form of

providing funding to adopt certain technologies, and the interview findings paralleled the quantitative findings in that this relationship was explained further by the interviewees. For instance, an interviewee said:

> I do not think that my family has a direct influence on my decision to use a new tool; they are not interested in technology as much as I am. Let's say I have some money in my pocket, and if this is enough for my technology needs, I might directly buy the product, even the cheapest one.

Unlike the excerpt above, there were also interviewees who think that parents' advice and suggestions in addition to financial support were important. The related excerpt is as follows:

> I think my family will be influential. Indeed, I do not expect my parents who are elderly to tell me that there are certain apps to download. Therefore, I have not observed this kind of influence so far, but their advice and suggestions are important for me.

As can be observed so far and explained above based on the research findings, subjective norm is significant in explaining and predicting behavioral intentions of EFL learners to use emerging technologies, which was also elaborated and triangulated with qualitative data. It seems that all the sub-factors of subjective norms are key to adopting technologies, and a response by one of the interviewees shows this:

> Generally speaking, friends are influential in choosing tools like WhatsApp or other social media tools. My family is the biggest reason to use my cell phone. My sister has also influenced me in using the social media. My teachers also influence me in using technologies or in playing games like Kahoot.

4.3.3.3. Perceived Behavioral Control

Perceived behavioral control as the third and final main predictor of behavioral intention is composed of three sub-factors—facilitating technology conditions, facilitating resources conditions, and self-efficacy— and qualitative data indicate it to be quite influential for EFL learners to decide to use three main emerging technologies—social networking sites, mobile devices, and digital games. Quantitative data that was examined in previous sections confirmed

that all sub-factors had a significant effect on perceived behavioral control with self efficacy as the most influential sub-factor, while perceived behavioral control itself was only significant at 90% confidence level in explaining or predicting behavioral intention.

Self-efficacy. The interview data revealed that participants felt quite comfortable with using emerging technologies and this let them use these technologies confidently. It is evident that if someone does not have a strong relation with technology in general (as we have seen in the adopter categories section), it is quite possible that the person will not intend to adopt certain technologies. For instance, one interviewee gave an example about how he did like his brother and how his brother adopted technologies thanks to his confidence:

> My older brother is quite confident with technology and devoted to it. He knows a lot about technologies and he is familiar with different tools. I generally want to be like him or I usually think that I should not fall behind him, which increases my curiosity and interest in technologies.

On the other hand, interviewees were also asked to rate themselves based on their use of technologies, and that paralleled their relation with existing technologies while giving an idea of their intentions to adopt technologies. For instance, one of the interviewees who gave himself a score of seven out of ten was observed to be familiar with most emerging technologies such as virtual reality and even MOOCs, while an interviewee with a score of four reported that he did not have a strong interest in emerging technologies. As a result, it is evident that there is a significant association between self-efficacy and perceived behavioral control, and any drop or increase in self-efficacy had a direct effect on perceived behavioral control and so intentions to use emerging technologies.

Facilitating technology & resource conditions. Interview data revealed that any positive change in terms of resources and technology available for EFL learners could influence their perception of control over their behaviors or intentions to adopt emerging technologies. For

instance, when interviewees were asked to imagine how their perception of technology would change, if they had had technology available for them during their previous years of education, and responses are as follows:

> Excerpt 1: I do not think I would have struggled to buy a smartphone if I had not had resources available. Actually, if I have resources, I buy and use technologies. However, If I do not, I take it as it is and would not push it further.
>
> Excerpt 2: If I was educated at a high school where all kinds of technology was available, or thinking about a high school environment where these resources were not available, that would certainly have a big effect on me. In this first scenario, I would be a person who is way into technology, and I would even be in a different department such as computer sciences or engineering where technology is used more. I would be more interested. As for the latter scenario, I would still be curious and try to explore it by myself.

As can be seen through the excerpts above, facilitating resources and technology might be influential in adopting or not adopting an emerging technology, and it might even completely change one's approach to technology in general.

4.3.4. Summary of the Qualitative Results

Qualitative data in this research were used to triangulate quantitative data and to present more in-depth analysis of the findings revealed through quantitative data. The qualitative data was used to bolster and affirm what the quantitative data was showing. As for the first research question and EFL learners' technology adopter categories, open-ended survey responses and interview findings revealed that participants had different opinions of technology in general. Their attitude and adopter categories might change based on the technology they intended to adopt. Finally, it was also quite evident that adopter categories might change as well in the long run even if it was the same technology.

The second research question focused on EFL learners' familiarity, proficiency, actual use, intentional use, benefits and finally drawbacks regarding several emerging technologies.

Qualitative results revealed that familiarity and proficiency differed among participants, and the score that participants gave for themselves differed as well based on their attitude toward adopting technologies. Secondly, in line with quantitative results, participants seemed to be more optimistic and enthusiastic when it came their intentions to use technologies; however, interviewees or open-ended survey respondents reported only a few technologies that they actually used for especially learning a language. As for the benefits of emerging technologies, three themes emerged from the qualitative data: more opportunities to practice language skills, the value of making the learning process more fun, enjoyable and interesting, and finally easy and quick access to information. On the other hand, three themes emerged from the data that were seen as drawbacks: inefficient use and waste of time, distraction and lack of concentration, and finally addiction and social isolation.

Finally, all the components of attitude even including dependence or addiction, and all the elements of subjective norm were also detailed extensively and analyzed further through interviews. These two main predictors of behavioral intention based on the adapted DTPB model proved to be very influential for EFL learners to adopt emerging technologies. On the other hand, perceived behavioral control and all its sub-factors were also uttered again as the elements to trigger the adoption of emerging technologies, however, it was observed that they seemed to be taken for granted and were not mentioned when interviewees were not asked directly about their influence on the adoption of emerging technologies.

CHAPTER FIVE:

DISCUSSION AND CONCLUSION

5.1. Introduction

The contribution of this study is to understand how students approach new technologies in general to support their foreign language learning process. The study benefitted from multiple disciplines and presented several different perspectives to achieve this aim. Today, it has been admitted by many researchers that students are "digital natives", and they make use of several different technologies everyday with different purposes. Assuming that today's students are already using new technologies, research in language pedagogy does not seem to have moved beyond generic perception studies. However, educators are still concerned not only with how to encourage EFL learners to adopt emerging technologies that could be invaluable in their language learning process, but also with "how to keep students interested in what they are learning" (Liu, Navarrete, Maradiegue, & Wivagg, 2014, p. 4). Thus, an understanding beyond students' perceptions with a purposive focus on their technology adopter categories by also exploring factors that have an influence on their adoption of emerging technologies is the key to knowing how to keep students interested in the learning process. Therefore, the purpose of this study was three-fold: to identify language learners' approaches to technologies; to examine their attitude toward emerging technologies with a focus on their familiarity, actual use, intentions and perceptions; and finally to analyze the factors and relationships among these factors that best predict language learners' intentions and decisions to use emerging technologies. The study

specifically aimed to explore the following emerging technologies: social networking, mobile learning, and digital games as major emerging technologies of today with also a focus on other emerging technologies: augmented reality, wearable technologies, virtual assistants, massive online open courses, 3D printing and online language learning platforms.

Hence, in light of the current research and emerging technologies listed above, this study sought the answers to the following questions:

(1) How do language learners approach new technologies in general?

(2) How do language learners perceive emerging technologies used for learning a foreign language with regard to following aspects: (a) familiarity with/proficiency in use of emerging technologies, (b) actual use of emerging technologies, (c) intentions to use emerging technologies, and benefits/drawbacks of using emerging technologies?

(3) What factors best predict language learners' intentions to use emerging technologies?

To answer these questions, the data were obtained through a survey, open-ended questions, and semi-structured interviews. The data were analyzed quantitatively, drawing on two complementary frameworks: innovation diffusion theory (Rogers, 2003), especially its application in technology adopter categories, and the adapted decomposed theory of planned behavior. The qualitative data was used to triangulate and affirm what the quantitative data was showing.

Based on the results of the analyses presented in the preceding chapter, this chapter will first discuss the findings on EFL learners' approach to emerging technologies in general and their adoption of these technologies in language pedagogy. The chapter also explains the significance of the findings and integrates the results of the study with the literature. Second,

pedagogical implications of the findings will be noted. Finally, the limitations of the study will be presented, and recommendations for future research will be provided.

5.2. Discussion of the Findings and Pedagogical Implications

In line with the research questions listed above and within the overall framework of the socio-psychological theories, the study revealed several interesting findings. The fourth chapter already presented the details regarding the results and analyses of these findings, and this section as part of the fifth chapter will present the findings under several themes in parallel with the research questions and will discuss existing research in the literature which will also be followed by suggested pedagogical implications for each finding.

5.2.1. Device Ownership

As for participants' demographic data, the study revealed that almost all the participants had a smart mobile device. A large number of the sample (n=426, 90%) reported having a smart phone and the rest (n=45, 10%) owning a phablet, a smart phone with a larger screen (see Table 4.2). On one hand, these findings seem quite expected since there is a trend toward staying connected through mobile devices such as smart phones and tablets instead of desktop or even laptop computers. According to the latest user data report by Facebook Inc. (2015), out of 1.59 billion monthly active users, the number of mobile users is 1.44 billion, which is believed to rise even more in the future. Considering various reports and data on mobile marketing (Bosomworth, 2015), we are now well past the tipping point in 2014 when the number of global mobile device users exceeded the number of desktop users, and this trend will surely rise more in the future as well. As this might affect several sectors or industries, it has also immense effect on education and language pedagogy. Although not directly focused on emerging technologies in this research, the trend to "bring your own device" (BYOD) is burgeoning, too (Johnson et al.,

2016), and the fact that most students today have their own mobile devices connected to the Internet promises a lot in terms of the integration of technology into language pedagogy. Without having to depend on available technology resources or facilities, language instructors can plan their activities and can expect all the students to bring their own devices. This becomes even more powerful when we consider that these devices are personal devices, and students can easily access any document, image, file, etc. whenever they need as part of a language activity. Finally, as one of forthcoming affordances of mobile devices, the factor of "anywhere" and "anytime" learning can empower both educators and learners (Kukulska-Hulme, 2009; Jarvis & Achilleos, 2013; Bayyurt, Ercetin, & Karatas, 2014). In addition, teachers' pedagogical expertise will continue to play an important role, but it needs to be re-examined and expanded to address the specific attributes of mobile learning (Kukulska-Hulme, 2009).

5.2.2. Comfort Levels with Computer and the Internet Technologies

The quantitative data also indicated that the survey participants felt quite comfortable with both computers and the Internet technologies. The number of students who reported being not at all comfortable with technologies compared with the ones who were very comfortable is very small (see Table 4.6). However, when gender as an independent variable is taken into consideration, the data indicated a significant difference with male students who reported being more comfortable with computers and Internet technologies than female students. This finding supports other similar studies and research (Liu, 2009; Aydin, 2007; Moyle et al.,2012; Goertler, 2012), which claim that gender difference is one of the factors that have been associated with computer skills and attitudes. For instance, Moyle and colleagues (2012) state that maintaining a computer was one of capabilities in which the largest gender differences were observed with the female students showing lower levels of ability. In addition, as also explained by Goertler

(2012), research has also found a digital divide that might show a difference in computer access and literacy based on gender. This means that even though a student might be born in the right year to be a digital native, he or she may not be a digital native due to gender or some other factors. Nevertheless, the finding that one's gender might be a factor in computer and Internet literacy does not necessarily mean that the attitude can show a similar pattern. Males and females might have different attitudes toward various uses of technologies without one being more literate than the other. For example, Liu's study (2009) reveals that female college students adopt more favorable attitudes toward information communication technologies (ICT) than males, and Liu adds that this result contrasts with the previous studies on gender differences in computer attitudes which were mainly conducted in western countries showing more technophobic and less positive attitudes amongst girls compared with boys. Therefore, it is possible to conclude that gender plays an important role in computer and Internet literacy and students' feeling of self-efficacy or confidence usually favoring males; however, this does not mean that their attitude has been shaped in the same way. Hence, instead of overgeneralizing the situation of young adults as a digital divide, educators need to take gender into consideration when they are planning to integrate technology into language courses. This gender difference can even be used as a strategy to foster collaboration and sharing among students from different genders.

5.2.3. Technology Adopter Categories and Diffusion of Innovation

Another main finding of this research is the technology adopter categories of the participants, and as one of the frameworks utilized in this study, the technology adopter category index (TACI) within the overall framework of Rogers' innovation diffusion theory (IDT) provides insights and implications regarding an individual's approach to technologies or to innovation. Although this study implements a one-shot survey in its research design, it also

triangulates with qualitative data in order to gather data related to EFL learners' adopter categories. The findings have implications regarding the adoption of several emerging technologies by EFL learners. Dugas (2005) worked with teachers for his study and looked for a relationship between actual adoption of a learning management system (LMS) and self-reported TACI scores. Dugas found that LMS adopters exhibited a slightly higher degree of innovativeness than LMS non-adopters; however, the difference was reported not to be statistically significant. Therefore, the findings indicate that TACI scores might help in two ways. First, the knowledge of TACI scores for each student and knowing how individual students approach innovations provide an effective insight into designing learning environments or the introduction and integration of new digital learning tools. Kim and colleagues suggest that although many educators and schools have worked hard to make new technologies such as mobile learning available to all students, the use of these technologies for language learning should be carefully implemented, and students' perceptions should be taken into consideration. As a result, students' perception becomes a key issue, and it is essential to recognize them when designing effective learning environments with new technologies. The TACI grounded within a very comprehensive research and theory known as IDT (Rogers, 2003), provides detailed characteristics for each category of end-users, and it suggests strategies to make the innovation diffusion process more efficient in the sense that available resources such as time, funding, energy, technology and human capital can be channeled into right directions as effectively as possible. It should be noted that the knowledge of adopter categories provides information regarding the dynamics among these groups and the progress of an innovations' diffusion. For example, while innovators are described as individuals to put their hands on a certain innovation before anybody else, early adopters are the people who might adopt a specific technology for a

purpose, and the latter is also the adopter category that has an influence on the rest of the population. Therefore, for an educator to integrate a new digital tool into teaching, adopter categories suggest that students falling under different categories might be paired or grouped in order to ease and speed the diffusion process. Furthermore, educators can focus on adopter categories such as early adopters and maybe early majority to influence the rest of the group positively so that students are given the impetus they need to adopt new technologies more quickly in their own classrooms. In addition to their role to act like an overall score toward innovations as mentioned above, TACI scores might change based on a specific innovation or simply over time. For instance, a few of the interviewees mentioned how ambitiously they approached very popular technologies such as social networking sites and mobile devices at first, but later on they stated that they either downgraded their smart phones or stopped using social media tools. Kim and colleagues (2013) studied language learners' perceptions toward new technology such as mobile devices and wanted to find out whether TACI scores change through time when students are exposed to technology. The results of their study (Kim et al., 2013) demonstrated that as students were provided with a learning environment where they had a chance to use their mobile technologies, they started to become more comfortable, and their TACI scores generally went down. Therefore, it appears that students will change their receptivity to technological innovation (i.e., adopter category) and embrace learning with mobile technologies when they have been exposed to an innovation over the length of time required to pass through the innovation-decision process (Kim et al., 2013). In conclusion, as a very important part and finding of this study, the TACI also within the general framework of IDT presents two separate benefits for educators as detailed above, and adopter categories might change over time regarding a specific innovation.

5.2.4. Proficiency in and Familiarity with Emerging Technologies

This study also aimed to investigate labels such as "digital natives" (Prensky, 2007) or the "net generation" (Oblinger, 2003) attributed to the students who have used computers and the Internet all their lives. While these concepts might be validated in certain ways, they have been mostly overgeneralized. The findings of this study indicated that EFL learners in a Turkish context were quite familiar with technologies such as social networking sites (SNSs) and mobile devices (MDs). However, other emerging technologies targeted in this research such as augmented reality (AR) and massive open online courses (MOOCs) in addition to 3D printing, wearable technologies (WTs), online language learning platforms (OLLPs) or virtual assistants (VAs) were reported to be quite foreign to the participants. Taking into account the fact that some of these technologies, especially the ones like AR, WTs, 3D printing, are listed as technologies that could have a large impact on teaching and learning in Higher Education in at most 2-3 years' time by the New Media Consortium's Horizon Reports, the results seemed surprising. Considering the total number of participants who reported having no idea at all (42%, n=197) and participants who never used MOOCs (38.6%, n=181) even if they knew it at the time of this research, the results seemed quite overwhelming since MOOCs are actually quite popular around the world even among top tier universities, and since MOOCs were shown among technologies that would be adopted in at most a year by the NMC Horizon Report in 2013 (Johnson et al., 2013). Therefore, Kyza (2013) suggests that prior to implementation, teachers need to attend to issues specific to the types of technology being used. In this case, adds Kyza (2013), one would have to consider three main points, and students' familiarity with the technology is one of them. In addition, without assuming that all EFL learners born in the same period of time have similar characteristics regardless of their culture or country, it is important

that schools and teachers provide pedagogical interventions that help all students acquire a basic familiarity with technology and think critically about technology issues (Pearson & Young, 2002).

While participants in this study were not very familiar with or proficient in minor emerging technologies, they reported being particularly proficient in major emerging technologies such as SNSs and MDs. The findings indicated that more than 80% of the participants were either competent or proficient in using SNSs and MDs with an additional 10% self-reportedly novice SNS users. This finding is in line with the most recent social network statistics indicating that around 90% of young adults actively use various SNSs, and most of the traffic is maintained through mobile devices. Interview data also confirmed how SNSs and MDs became an essential part of young individuals' experiences. Mitchell (2012) states that Facebook and social network sites in general have become an integral part of teenage and adult social life, and one teenager in Mitchell's study reported that an individual doesn't "exist" if not on a social network site. Therefore, all these findings suggest that this difference in "lifestyle" gives educators a reason to believe we should incorporate SNS usage, and mobile devices into our class-related activities, to capture these students' imaginations, their thought patterns and socializing habits (Godwin-Jones, 2008; Winke & Goertler, 2008).

5.2.5. Intentional Use vs. Actual Use of Emerging Technologies

This research also aimed to differentiate between EFL learners' intended and actual use of emerging technology. Although participants were labeled as "digital natives" who were born into technology by previous research, it was expected that there would be a large gap between students' intended and actual use of emerging technologies. There might be several reasons for this, and McBride (2009) states that although technology is an integral part of neo-millennial

students' lives, they often do not know how to use technology in ways that would benefit them even if they are aware of the fact that those tools may be quite beneficial in their language learning process. In another study, Roblyer and colleagues (2010) surveyed faculty and students, and found students were rather positive-minded about future perspectives of Facebook in higher education. On the other hand, as also mentioned in the second chapter, other research points to the observation that the majority of students are, despite all their self-disclosure, inclined to consider Facebook as a tool that is part of their private lives and consequently, are not fond of the idea of letting educational matters slip into their Facebook activities (Decuypere & Bruneel, 2012). The findings of this study did not reveal a large gap between EFL learners' intended or actual use of some major emerging technologies such as SNSs and MDs in their language learning process; however, the gap was quite large when other minor emerging technologies such as VAs, WTs, AR, MOOCs and OLLP were taken into consideration. To illustrate, while more than 80% of the sample reported never using the technology listed immediately above, almost over 50% expressed their willingness to use those emerging technologies to learn or practice a language. Interview responses were also similar in the sense that participants stated their eagerness to use technologies that they had never experienced before such as 3D technologies. Hartshorne and Ajjan (2009) studied students on their use of Web 2.0 technologies, and the findings of their research revealed that while students acknowledged the pedagogical benefits of Web 2.0 applications in higher education, there was limited use of these tools to supplement instruction in their courses with the majority of the respondents who do not currently use and have no plans to use those technologies. Similarly, Sadaf (2013) studied pre-service teachers' intentional and actual use of Web 2.0 technologies during their student teaching after a treatment in which pre-service teachers were trained about those technologies. The results of this study

showed that most of the sampled pre-service teachers were able to translate their intentions into actions during student teaching. Although they intended to use several Web 2.0 tools (video editing/sharing, wikis, blogs, online office tools, etc.), they mostly used YouTube in the classroom. Therefore, this study confirmed other similar studies in the literature focusing on the difference between participants' intentional and actual use of new technologies with self-reported intentional use not being completely translated into actual use even if participants were exposed to a treatment or any interventions (Hartshorne & Ajjan, 2009; Sadaf, 2013; Baltaci, Goktalay & Ozturk, 2010). In brief, considering the findings of this study and other similar studies in the body of literature, there seems to be a difference between students' actual and intentional use of technologies. While EFL learners might intend to adopt specific emerging technologies due to their observed benefits, they may not necessarily carry out their intentions into actual adoption. Nevertheless, there seems to be facilitative factors to minimize the gap between intentional and actual use of emerging technologies, and educators need to consider these factors when planning and designing language programs.

5.2.6. An Awareness of the Benefits of Emerging Technologies

Even though the study revealed a difference between Turkish EFL learners' intentions to adopt emerging technologies and their actual use, the findings from the participants also indicated that respondents were both encouraged to adopt these technologies and aware of the benefits of targeted emerging technologies. SNSs, MDs, and OLLPs were among the most beneficial emerging technologies since they were believed to improve language learning, interaction, collaboration and sharing among EFL learners. Interview data also confirmed that emerging technologies such as specifically SNSs, MDs and digital games were quite effective in benefitting to the interviewees in different ways such as ease of access to their teachers or

friends, communication, vocabulary development, and so forth. In fact, there are several studies focusing on the affordances of listed emerging technologies, and most of them were detailed in the second chapter (Ushioda, 2013; Stevens, 2013; McBride, 2009; Mitchell, 2012; Hartshorne & Ajjan, 2009). Hence, all these findings suggest that educators might start planning language programs with all these benefits in mind and can build their ideas on this existing tendency. However, since there exists a gap between projected and actual use of emerging technologies, educators need to be cautious and should not be led to believe that a certain tool that may seem to be very beneficial by the students will work the best no matter how it has been planned and presented. As previously mentioned, when educators plan to integrate listed emerging technologies personally used by the students into classroom practices, there is always the risk of not being able to retain the authenticity embodied in these technologies and produce an artificial activity in class, which will result in a drop in EFL learners' actual use of emerging technologies.

5.2.7. Attitude

The decomposed theory of planned behavior (DTPB) is the second core theoretical framework utilized in this study, and it was adapted for this research with EFL learners in mind who were newly enrolled at a university in Turkey. The DTPB, as previously mentioned in great detail in previous chapters, provides increased explanatory power and a more precise understanding of the behavior (Taylor & Todd, 1995), and it also provides a comprehensive way to understand how an individual's attitude, subjective norm, and perceived behavior control can influence his or her intentions to adopt innovations (Ajjan & Hartshorne, 2008). Hence, attitude is one of the core constructs of the DTPB model in predicting intention and so behavior itself. Previous studies utilizing the DTPB model and scale have revealed that attitude is statistically the best predictive factor for behavioral intention, and it is decomposed into normally three sub-

factors: ease of use, perceived usefulness, and compatibility (Taylor & Todd, 1995; Ajjan & Hartshorne, 2008; Hartshorne & Ajjan, 2009; Venkatesh et al., 2003; King & He, 2006; Legris et al., 2003). Indeed, the DTPB has been used extensively in various disciplines, but there has not been a single study based on language learners' adoption of specific technologies; nevertheless, there have been studies focusing on students' use of new technologies in other areas, not necessarily language pedagogy. For instance, Ajjan and Hartshorne (2008) carried out a study with students taking a technology class about their adoption of Web 2.0 technologies, and they found out that attitude explained more than 60% of the variance in behavioral intention, which made attitude by far the most effective factor influencing students' decisions to adopt Web 2.0 technologies. In another study by Sadaf (2013) focusing on pre-service teachers' adoption of Web 2.0 technologies, attitude was found to have explained a very large percentage (84%) of the variance in behavioral intention compared with other main factors of behavioral intention. Liu (2009) also found that success in adopting technologies and in a technology class correlates with language learners' attitudes towards technologies. Aydin (2007) states that achievement in EFL learning via the Internet depends on the positive attitudes of learners. Based on the literature, it is evident that attitude, whether positive or negative, has a strong effect on the behavior itself. As explained in the fourth chapter, the findings of this study also confirmed existing research in the literature, and it was found that attitude explained 54% of the variance in behavioral intention, which made it the most powerful predictor of behavioral intention. This finding is similar to that in a study by Ajjan and Hartshorne (2008). Interview data also revealed that when EFL learners in Turkish context think that a digital tool is easy to use, compatible with their existing devices, and could be beneficial for them in their language learning process, there is a high probability that they will develop positive attitude toward the tool and in return could adopt it. As already

detailed in the second chapter, the connection between attitude and the actual use of technologies is two-fold: any successful change in educational practice necessitates the development of positive attitudes toward the new technology, and this, on the other hand, motivates learners to use that technology in their future learning. Therefore, successful language teachers need to keep in mind that it is useful for learners to develop positive attitudes in order to adopt technologies to be integrated in language classes. In addition, educators also need to integrate these new technologies in such an effective way that this could influence students' attitude toward the use of other new technologies in their language learning process.

5.2.8. Fun and Enjoyment vs. Dependence

In the original DTPB model (see Figure 2.7), attitude is predicted by three sub-factors: ease of use, perceived usefulness, and compatibility. These sub-factors have already been successful in explaining a large proportion of variance in attitude (Taylor & Todd, 1995; Ajjan & Hartshorne, 2008; Hartshorne & Ajjan, 2009; Venkatesh et al., 2003; Aydin, 2007). However, taking into account the research sample in this study, it was assumed that fun and enjoyment in addition to dependence could play an effective role in predicting attitude and make it a stronger predictor of behavioral intention in return (see Figure 3.1 for the adapted DTPB model). Fun and enjoyment as a factor for attitude is quite self-explanatory and can be defined as a feeling of joy, elation, or pleasure associated by an individual with the adoption and use of an innovation, while dependence is defined as the state or feeling of being reliant on a certain innovation. In several existing studies, enjoyment was listed among the reasons why students adopt and also use a certain tool (Zhu & Bu, 2009; Stepp-Greany, 2002; Moyle et al., 2012; Hsu, 2013). It was observed in these studies that enjoyment could act both as a reason for and a result of technology integration into language pedagogy. In this current research, it was found that fun and enjoyment

played a key role in explaining a large proportion of variance in attitude, and it turned out to be the most significant factor that might influence EFL learners' attitude toward adopting new technologies. Therefore, it can be concluded that the addition of this factor made the model more powerful in predicting one's behavior to adopt new technologies. Interview data also confirmed that EFL learners would keep on using new technologies as long as they believed the adoption process is fun and enjoyable for them. Hence, educators or decision-makers need to consider fun and enjoyment as a component of language programs and classes in which they plan to integrate technology so that adoption can take place at a higher rate. In addition, the existence of fun factor might help with the sustainability of the use of new technologies in language pedagogy.

On the other hand, as also detailed in the fourth chapter, alpha coefficients indicated that dependence as a variable in the adapted DTPB model had a low internal consistency (α=.52), and this prohibited drawing an inference about its significance as a sub-factor of attitude. This finding seems quite interesting, though, when we take into consideration the studies which suggest that individuals might adopt new technologies because they might simply feel attached or reliant on specific technologies (Venkatesh et al., 2013). Indeed, interview data showed that some EFL learners might keep using new technologies since they feel like they are reliant on technologies such as social networking sites or mobile devices. However, some participants may not have considered these major technologies as an indispensable part of their language learning processes as suggested by survey items even if they might have reported being dependent or reliant on specific technologies in their personal life. Therefore, it is possible that the constructs or the survey items might be reconsidered and edited so that they could reflect dependence or reliance better as a sub-factor for attitude. On the condition that at least a moderate internal

consistency is observed, there might be pedagogical implications regarding dependence as a reason to adopt new technologies in language pedagogy.

In conclusion, fun and enjoyment as a sub-factor of attitude was observed to be the most significant predictor of attitude, and needs to be considered when a new technology is integrated into language programs, while dependence as a variable in the adapted DTPB model could not be considered as significant in influencing attitude, and no pedagogical implications can be drawn based on it.

5.2.9. Parents' Influence

Subjective norms defined as the social pressure individuals experience when performing a particular behavior is one of the three main predictors of behavioral intention in the DTPB model, and the adapted DTPB model in this study suggests that EFL learners might be affected by their peers, teachers and parents. Although the original DTPB model does not include parents' influence among sub-factors of subjective norms, it was thought that parents' influence might be an important sub-factor for EFL learners in Turkish context when they intend to adopt new technologies due to the fact that they have just enrolled for the university, and they are both culturally and economically dependent on their parents. Therefore, it was assumed that even though parents would not have a direct effect on young EFL learners by being a role model in terms of adopting emerging technologies, it was thought that EFL learners in this study would seek for their parents' approval or advice when they plan to adopt new technologies or devices. On the other hand, peers or teachers were expected to have a direct effect and the largest influence on EFL learners (Liu, 2009). As already detailed in the fourth chapter, open-ended survey responses revealed that a majority of the the respondents indicated that they were influenced by mostly their peers and teachers in discovering and adopting new technologies.

Unexpectedly though, the results of the adapted DTPB scale revealed that parents were the largest factor that influenced EFL learners' intentions to adopt new technologies. Peers and teachers were the next largest factor after parents. There have been studies that utilized the DTPB model, and their findings indicate that subjective norm has been a significant factor for behavioral intention with its sub-factors: peer and superior influence (Ajjan & Hartshorne, 2008; Sadaf, 2013). The current study, for the first time in the literature, revealed that parents' influence was a significant factor for EFL learners in Turkish context to adopt emerging technologies. These findings suggest that educators need to take subjective norm into account when planning language pedagogy programs. Although this does not sound reasonable for students at higher education, administrators or decision-makers at institutions before university might increase parents' awareness of their critical influence on students' adoption of new technologies. With also the TACI in mind, teachers can create purposively non-homogeneous groups of students in different adopter categories so that peers might influence one another in adopting new technologies. Finally, teachers should also be aware of the fact that they are very influential in EFL learners' decisions to adopt emerging technologies, and they always need to keep themselves up-to-date with most recent technologies as a role model for their students if they want to successfully introduce technology into their teaching.

5.2.10. Perceived Behavioral Control and Self Efficacy

Perceived behavioral control, defined as the control individuals feel over their behavior, is originally decomposed into two sub-factors: facilitating conditions and self efficacy. The adapted DTPB model in this study utilized the same decomposition for perceived behavior control with the only exception that facilitating conditions were represented as two factors: facilitating technology conditions and facilitating resource conditions. According to the findings

of this study, all three sub-factors of perceived behavioral control, facilitating conditions in terms of both available resources and technology in addition to self efficacy were found to have a positive influence on perceived behavioral control, while perceived behavior control itself as a variable was found to have an influence on behavioral intention only at 90% confidence level, which suggested a lower confidence level. Ajjan and Hartshorne (2009) having carried out a similar study about students' adoption of Web 2.0 technologies found self-efficacy and facilitating resource conditions as significant determinants of perceived behavioral control, and they suggested that training and access to resources were important mechanisms to influence the adoption of new technologies. In addition to this, the finding that facilitating technology conditions had an influence on the adoption of emerging technologies by EFL learners suggests that whether the institution provides and allows access to all emerging technologies is significant for EFL learners to adopt these technologies. This finding is quite reasonable in the sense that some of the targeted technologies in this study were augmented reality, wearable technologies, and 3D printing. Since these technologies were not commonly available to the participants, they might have thought that availability of facilitating technology conditions might influence their use of these emerging technologies. Finally, the linkage between perceived behavioral control and behavioral intention did not prove to be reliable. Previous studies revealed that the linkage between perceived behavior control and behavioral intention was significant even if at a lower confidence level than the other constructs. One reason why this linkage was found to be statistically non-significant could be that EFL learners might have thought the adoption of major emerging technologies was not entirely within their control, but it might be teachers or administrators who had control over the adoption of instructional tools in language classrooms. Therefore, the determinants of the constructs might be reviewed and modified if necessary to

make the adapted DTPB model statistically more powerful based on the participants' role and characteristics (Ajjan & Hartshorne, 2009; Hartshorne & Ajjan, 2008; Sadaf, 2013).

5.3. Directions and Suggestions for Future Research

This study has been quite comprehensive and inclusive in the sense that it focused on several different emerging technologies, and it aimed to draw an overall picture of EFL learners' adoption of emerging technologies by focusing on several inter-related and complementary aspects. As all these listed emerging technologies become increasingly ubiquitous, the present study, however inclusive and far-reaching it has been, presents a first step in understanding factors leading to Turkish EFL leaners' adoption of nine emerging technologies, as well as methods of fostering support for student use of these new technologies. As mentioned above, the present study covers a wide-range of technologies by focusing on several aspects; however, given the findings of the present study and the limitations of a study at this scale, several recommendations can be made, and directions can be drawn for future research. First, the TACI scale provides information regarding people's technology adopter categories, which in return informs about the characteristics that each group might have, and also the dynamics among different adopter categories. Additionally, the adapted DTPB scale has provided information about the most important factors for the adoption of emerging technologies so that investments and efforts can be arranged accordingly. The adapted DTPB scale in this study was informative about various factors leading to behavioral intention, but no connection has been made between intention and actual use since a wide range of technologies was focused on. Therefore, a future research might make a comparison between TACI scores and the DTPB factors for potential relations between these two models. Since there has not been a study looking for a relation between adopter categories and factors leading to adoption, this might provide deeper insights

into participants' adoption characteristics, and the most important factors to be focused on to be able to make better investments while planning language programs.

Second, as previously mentioned, the present research presents a first step in understanding factors leading to Turkish EFL leaners' adoption of nine emerging technologies by providing an overall impression about these technologies and information regarding the most important factors leading to EFL learners' adoption of several emerging technologies. Some of these technologies are quite broad in scope and needs further analysis. Therefore, a future study might focus on each of these emerging technologies at a time, and it may present a precise information and an in-depth analysis regarding the adoption of that specific technology.

Third, both quantitative and qualitative data in this study gathered through surveys, open-ended questions, and interviews were based on self-reported responses and depicted only one frame of observation at a time when surveys were distributed, and interviews were carried out. In a future study similar to the study by Sadaf (2013), a treatment or an intervention might be provided, and the change in attitudes, perceptions, beliefs, intentions and finally actual behavior might be observed. This kind of data will ensure that instructors and other relevant decision-makers focus their attention, efforts, and investments on providing opportunities and environments for EFL learners based on informed decisions rather than channeling resources, time, and human capital in all directions and making less than optimal investments.

Fourth, this study utilized the adapted DTPB scale as theoretical framework, and new factors leading to adoption of an innovation were added to the existing DTPB model. While some of the newly-added factors increased the predictive power of the model, it was observed that some other factors did not work well to predict behavioral intention. Therefore, the current adapted DTPB model might be reviewed and remodeled. While some factors might be added,

some others can be edited or rearranged under different predictors. As a result, it is possible that the predictive power of the model will increase, and the model will become more parsimonious in nature. For instance, although self efficacy as the sub-factor of perceived behavior control has a high predictive power, while perceived behavior control has been found to be only significant at a borderline in various studies. Therefore, such remodeling can be made that the predictive and explanatory power of the DTPB model might increase as an inclusive model for the adoption of innovations.

Finally, this study focused on EFL learners in Turkish universities, a public and a private university. Therefore, the study might be replicated including more institutions and more diversity so that the results might be generalized to the target population. Since this is the first study to utilize both TACI and the DTPB in EFL context with initially EFL learners as the target population, the research design can be modified, and the study can also be replicated with EFL instructors or even administrators as the target population.

5.4. Conclusion

Overall results of the study indicated that EFL learners in a public and a private university in Istanbul, Turkey owned several recent electronic devices or gadgets, and a majority of the participants felt that they were quite comfortable with both computer and the Internet technologies despite some gender-based differences. Additionally, the findings revealed that EFL learners in Turkish context were very familiar with all the listed emerging technologies although their familiarity with several minor emerging technologies such as virtual assistants, wearable technologies, augmented reality, and massive open online courses was quite low compared to the other major emerging technologies such as social networking sites, mobile devices, and digital games. The findings of the TACI scale indicated that the research sample was normally

distributed among adopter categories. As for an awareness of the benefits of all listed emerging technologies, the results of the study indicated that EFL learners' awareness is quite high especially regarding emerging technologies such as social networking sites and mobile devices; however, it was also found that participants' intention to use these emerging technologies or their actual use was very low. Finally, the adapted DTPB scale implied that some factors were more significant in EFL learners' intentions to adopt emerging technologies such as their attitude and subjective norms, while perceived behavior control did not prove to be significant due to a low alpha score. Furthermore, several sub-factors were found to be more important compared with other sub-factors. For instance, enjoyment and parents' influence, which were both newly added into the adapted DTPB scale, were found to be the most important sub-factors for respectively attitude and subjective norms, while as an existing sub-factor of perceived behavioral control, self efficacy proved to be the most important factor in EFL learners' adoption of emerging technologies.

Taking previous research into account, overall findings of the present study gained through both qualitative and quantitative data provided deeper insights into Turkish EFL learners' adoption of emerging technologies. As also listed and detailed through the current section of the fifth chapter, the knowledge of EFL learners' device ownership, comfort levels with both computers and Internet technologies, their familiarity with and proficiency in emerging technologies, and finally the knowledge of EFL learners' awareness of the benefits regarding emerging technologies should be used by educators, policy and decision makers in planning language pedagogy programs. In line with this, pre-service or in-service teacher training programs can be reexamined and arranged accordingly on the topics such as the integration of new technologies into language classroom practices. More importantly, as very well-established

theories and models in the field of social psychology, the knowledge of technology adopter categories gained through the TACI scale, and the knowledge of the factors for the adoption of emerging technologies collected through the adapted DTPB scale should provide greater insights into planning the overall cycle of arranging language programs starting from the training of pre-service teachers to the evaluation of existing language teaching curricula. Because of the insights gained through this research and especially through the TACI scale and the adapted DTPB scale, instructors and other relevant decision-makers might focus their attention, efforts, and investments on providing opportunities and environments for EFL learners based on informed decisions in accordance with these findings rather than channeling resources, time, and human capital in all directions and make less than optimal investments.

Appendix A

Data Collection Instrument: Survey

Emerging Technologies in Language Pedagogy: Language Learners' Perceptions through the Lenses of Innovation Diffusion and User Intention Theories

Welcome!

The following survey is designed as part of a data collection tool for a dissertation research carried out at the University of Arizona. It aims to assess your intentions and explore your perceptions of using the following new/emerging technologies in language pedagogy: social networking sites, mobile learning, digital games, augmented reality, virtual assistants, wearable technologies, online language learning platforms, massively open online courses and 3D printing.

This research has been approved by the Institutional Review Board (#1505827306) at the University of Arizona. Please read each question carefully and follow the instructions provided in each case. Providing full answers in those questions are important for the success of this survey. You can read more details about the research and access to consent form by clicking here. All the information you provide as part of this survey are strictly confidential. Thanks for taking your time to answer this survey and helping a fellow graduate student!

By participating in the following survey, you acknowledge and accept the conditions of this study and give permission for the investigator to use the information provided for research purposes.

Mustafa Polat PhDc, Second Language Acquisition and Teaching

SECTION I: DEMOGRAPHICS

What is your gender?

- ❍ Male
- ❍ Female

What is your university?

……

What is your major / department?

……

What is your language proficiency level?

- ❍ Beginner/Elementary (A1)
- ❍ Pre-intermediate (A2)
- ❍ Intermediate (B1)
- ❍ High/Upper-intermediate (B2)
- ❍ Advanced (C1-C2)

What personal technology devices/gadgets do you own?

- ❑ Laptop computer (netbook, ultra-book or regular)
- ❑ Desktop computer
- ❑ Basic phone
- ❑ Smart phone (screen size: ~5 inches and below)
- ❑ Phablet (screen size: ~5.1 - 6.9 inches)
- ❑ Tablet (screen size: ~7 inches and above)
- ❑ Smart watch
- ❑ Portable music player
- ❑ Other _____

Comfort level with computers?

- ❍ Not at all comfortable
- ❍ Somewhat comfortable
- ❍ Fairly comfortable
- ❍ Very comfortable

Comfort with using Internet technologies

- ❍ Not at all comfortable
- ❍ Somewhat comfortable
- ❍ Fairly comfortable
- ❍ Very comfortable

SECTION II: TECHNOLOGY ADOPTER CATEGORY INDEX

Please use the following rubric to determine your adopter category index. Choose the number of the description that most reflects your approach to the adoption of new technology; that is, technology in general, not just educational technology.

- ❍ 1. I tend to adopt new technology as soon as it is available to me. My interest lies more with the technology itself than with its application to specific problems.
- ❍ 2. In between 1 and 3
- ❍ 3. I explore new technologies for their potential to bring about improvements. I am willing to try new things, and am not averse to occasional failure.
- ❍ 4. In between 3 and 5
- ❍ 5. I adopt a "wait and see" attitude toward new technology, and want examples of close-to-home successes before adopting. I want to see value in an innovation before adopting it.
- ❍ 6. In between 5 and 7
- ❍ 7. I accept new technology later in the game, once the technology has become established among the majority.
- ❍ 8. In between 7 and 9
- ❍ 9. I accept new technology later in the game, once the technology has become established among the majority.

SECTION III: ATTITUDE SCALE

1. Please list your level of proficiency with the following emerging technologies.

	Never know	Never use	Novice	Competent	Proficient
Social Networking (Facebook, Twitter, Instagram)	❍	❍	❍	❍	❍
Mobile Devices/Systems (iPhone, Android, iOS, Nexus)	❍	❍	❍	❍	❍
Digital Games (WOW, Minecraft, GTA, CoD, PES, NFS)	❍	❍	❍	❍	❍
Augmented Reality	❍	❍	❍	❍	❍
Virtual Assistants (Siri, S-Voice, Google Now, Cortana, Echo)	❍	❍	❍	❍	❍
Wearable Technologies (Google Glass, Fitbit, Apple Watch, Samsung Gear)	❍	❍	❍	❍	❍
3D Printing	❍	❍	❍	❍	❍
Online Language Learning Platforms (Duolingo, Busuu, Babbel, Live Mocha)	❍	❍	❍	❍	❍
Massive Online Open Courses (MOOCs)	❍	❍	❍	❍	❍

2. To what extent do you use the following emerging technologies to supplement/improve your in-class learning?

	Don't use	Use occasionally	Frequently use	Always use
Social Networking (Facebook, Twitter, Instagram)	❍	❍	❍	❍
Mobile Devices/Systems (iPhone, Android, iOS, Nexus)	❍	❍	❍	❍
Digital Games (WOW, Minecraft, GTA, CoD, PES, NFS)	❍	❍	❍	❍
Augmented Reality	❍	❍	❍	❍
Virtual Assistants (Siri, S-Voice, Google Now, Cortana, Echo)	❍	❍	❍	❍
Wearable Technologies (Google Glass, Fitbit, Apple Watch, Samsung Gear)	❍	❍	❍	❍
3D Printing	❍	❍	❍	❍
Online Language Learning Platforms (Duolingo, Busuu, Babbel, Live Mocha)	❍	❍	❍	❍
Massive Online Open Courses (MOOCs)	❍	❍	❍	❍

3. How likely is it that you will use of the following types of emerging technologies to learn/practice a language in the future?

	Highly unlikely	Unlikely	Undecided	Likely	Highly likely
Social Networking (Facebook, Twitter, Instagram)	❍	❍	❍	❍	❍
Mobile Devices/Systems (iPhone, Android, iOS, Nexus)	❍	❍	❍	❍	❍
Digital Games (WOW, Minecraft, GTA, CoD, PES, NFS)	❍	❍	❍	❍	❍
Augmented Reality	❍	❍	❍	❍	❍
Virtual Assistants (Siri, S-Voice, Google Now, Cortana, Echo)	❍	❍	❍	❍	❍
Wearable Technologies (Google Glass, Fitbit, Apple Watch, Samsung Gear)	❍	❍	❍	❍	❍
3D Printing	❍	❍	❍	❍	❍
Online Language Learning Platforms (Duolingo, Busuu, Babbel, Live Mocha)	❍	❍	❍	❍	❍
Massive Online Open Courses (MOOCs)	❍	❍	❍	❍	❍

4. What are in your opinion the advantages of using each of the following emerging technologies to supplement your in-class learning? Important: You can select multiple answers for each emerging technology in this question.

	Improve student-teacher interaction	Improve student learning	Improve student satisfaction with the course	Improve interaction with other students	Improve student grades	Improve student language ability	Easy to use/share content knowledge	Improve critical thinking with collaborative learning
Social Networking (Facebook, Twitter, Instagram)	❑	❑	❑	❑	❑	❑	❑	❑
Mobile Devices/Systems (iPhone, Android, iOS, Nexus)	❑	❑	❑	❑	❑	❑	❑	❑
Digital Games (WOW, Minecraft, GTA, CoD, PES, NFS)	❑	❑	❑	❑	❑	❑	❑	❑
Augmented Reality	❑	❑	❑	❑	❑	❑	❑	❑
Virtual Assistants (Siri, S-Voice, Google Now, Cortana, Echo)	❑	❑	❑	❑	❑	❑	❑	❑
Wearable Technologies (Google Glass, Fitbit, Apple Watch, Samsung Gear)	❑	❑	❑	❑	❑	❑	❑	❑
3D Printing	❑	❑	❑	❑	❑	❑	❑	❑
Online Language Learning Platforms (Duolingo, Busuu, Babbel, Live Mocha)	❑	❑	❑	❑	❑	❑	❑	❑
Massive Online Open Courses (MOOCs)	❑	❑	❑	❑	❑	❑	❑	❑

SECTION IV: OPEN ENDED QUESTIONS

There are four open ended questions in this section, and answer each question as detailed as possible to reflect your opinions well considering the following three main technologies: social networking sites, digital games, and mobile devices.

1. What do you view as the advantages of using emerging technologies (such as social networking, digital games, or mobile devices) to supplement in-class learning?

2. What do you view as the disadvantages of using emerging technologies (such as social networking, digital games, or mobile devices) to supplement in-class learning?

3. Who are the groups or people who would influence your intentions to use emerging technologies in a language classroom to supplement in-class learning? Explain how.

4. What is the most important factor that would influence your use of emerging technologies (such as social networking, digital games, or mobile devices) in your future learning as a student?

SECTION V: THE DTPB SCALE

Thinking of your familiarity and experience with the emerging technology applications to what extent do you agree or disagree with the following statements:
Important: When answering following statements, please keep in mind that we are using the definition of emerging technologies that encompasses technologies which have not been strongly or extensively integrated into language curriculums. In this part of the study, please consider three main technologies, which are social networking sites, mobile technologies, and digital games with a focus on your current and future language learning experiences, practices or plans.

	Strongly agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
1. I plan to use emerging technologies in my language learning experience this term and in the future.	❍	❍	❍	❍	❍
2. I intend to use emerging technologies to improve my language skills.	❍	❍	❍	❍	❍
3. Emerging technologies will be useful in my learning a language.	❍	❍	❍	❍	❍
4. Using emerging technologies is a good idea in language classrooms.	❍	❍	❍	❍	❍
5. Using emerging technologies in my language learning will make it more fun and enjoyable.	❍	❍	❍	❍	❍
6. I feel that emerging technologies will be easy to use in language learning.	❍	❍	❍	❍	❍
7. I feel using emerging technologies would be clear and understandable.	❍	❍	❍	❍	❍
8. I feel it would be easy for me to become a competent learner at using emerging technologies.	❍	❍	❍	❍	❍
9. I feel that using emerging technologies will help me learn more about the subject.	❍	❍	❍	❍	❍
10. I feel that using emerging technologies will improve my satisfaction with the course.	❍	❍	❍	❍	❍
11. I feel that using emerging technologies will improve my grades.	❍	❍	❍	❍	❍
12. The advantage of using emerging technologies outweighs the disadvantages of not using it.	❍	❍	❍	❍	❍
13. Using emerging technologies are compatible with the way I learn.	❍	❍	❍	❍	❍
14. Using emerging technologies fit well with the way I will learn a language.	❍	❍	❍	❍	❍
15. Using emerging technologies will fit into my learning style.	❍	❍	❍	❍	❍
16. It will be fun to learn and practice a language with emerging technologies.	❍	❍	❍	❍	❍
17. I enjoy using emerging technologies in my language learning.	❍	❍	❍	❍	❍

18. I will not be able to learn a language without emerging technologies.	❍	❍	❍	❍	❍
19. Using emerging technologies will be an indispensable part of my language learning.	❍	❍	❍	❍	❍
20. My peers will be using emerging technologies in their language classrooms.	❍	❍	❍	❍	❍
21. My peers think I will benefit from using emerging technologies in my future language classrooms.	❍	❍	❍	❍	❍
22. My teachers will think it is important I use emerging technologies in my language classrooms.	❍	❍	❍	❍	❍
23. My parents will think it is important to use emerging technologies in my language classrooms.	❍	❍	❍	❍	❍
24. Peers who influence my behavior would think that I should use emerging technologies in learning a language.	❍	❍	❍	❍	❍
25. Peers who are important to me would think that I should use emerging technologies in language classrooms.	❍	❍	❍	❍	❍
26. My teacher, whom I will report to would think that I should use emerging technologies in the language classroom.	❍	❍	❍	❍	❍
27. I will have to use emerging technologies in the classroom because my teachers will require it.	❍	❍	❍	❍	❍
28. My parents think that I should use emerging technologies in learning a language.	❍	❍	❍	❍	❍
29. My parents who are important to me think that I should use emerging technologies in my language classrooms.	❍	❍	❍	❍	❍
30. Using the emerging technologies is entirely within my control.	❍	❍	❍	❍	❍
31. I have the knowledge and ability to use emerging technologies.	❍	❍	❍	❍	❍
32. Emerging technologies are compatible with the computer or other devices I will use in my language classroom.	❍	❍	❍	❍	❍
33. Emerging technologies will work properly together with other available technologies in the classroom.	❍	❍	❍	❍	❍
34. I will be able to use emerging	❍	❍	❍	❍	❍

technologies using any computer connected to the Internet.					
35. There will be other devices and computers available to use together with emerging technologies.	❍	❍	❍	❍	❍
36. I would feel comfortable using emerging technologies.	❍	❍	❍	❍	❍
37. I could easily use emerging technologies on my own.	❍	❍	❍	❍	❍
38. I know enough to use emerging technologies.	❍	❍	❍	❍	❍

SECTION VI: EMAIL SIGN-UP FOR FOLLOW-UP INTERVIEWS

Thank you for your responses so far. There is one more single step to complete the survey. If you would like to volunteer to participate a follow-up interview, please enter your e-mail address into the space provided below. Your support and help are really appreciated and you will be contacted soon to set up a meeting for the interview. Thank you.

Appendix B

Data Collection Instrument: Semi-structured Individual Interview Protocol*

*This is a semi-structured interview and questions specified in this protocol are not necessarily to be directed in the order they are listed here. The discussion will be mainly around these topics and questions, though. The emerging technologies to be discussed are as follows:

- Social networking sites
- Mobile learning
- Digital games
- Augmented reality
- Virtual assistants
- 3D printing
- Wearable technologies
- Online language learning platforms
- Massively open online courses

1. What is/are (a) new technology (ies) for you?
2. Tell me about your familiarity and experiences with the given emerging technologies.
3. What does technology mean for you and what is your interest in new/emerging technologies? How do you feel about these technologies? Would you consider yourself an addict?
4. What are in your opinion the advantages and disadvantages of the emerging technologies listed above?
5. Is there any technologies or devices you could not do without?
6. Are you using any of these technologies to supplement or support your language learning process?
7. Would you use these technologies to supplement or support your future language learning process?
8. As a language learner, how much influence other people (peers, parents, and teachers) will have on your decision to use or not to use emerging technologies (SNSs, ML, DGs)?
9. In what ways do you think technology or available resources will impact your decision to use emerging technologies?
10. What is the most important factor that influences your decision to use emerging technologies to learn English? Why? How?
11. How do you feel about using these technologies to learn a language? Would you enjoy it?
12. Do you have any other comments/suggestions?

Appendix C

The University of Arizona (UA) Institutional Review Board (IRB) Approval

THE UNIVERSITY OF ARIZONA

Human Subjects Protection Program

1618 E. Helen St.
P.O.Box 245137
Tucson, AZ 85724-5137
Tel: (520) 626-6721
http://orcr.arizona.edu/hspp

Date:	May 11, 2015
Principal Investigator:	Mustafa Polat
Protocol Number:	1505827306
Protocol Title:	Emerging Technologies in Language Pedagogy: Language Learners' Perceptions through the Lenses of Innovation Diffusion and User Intention Theories
Level of Review:	Exempt
Determination:	Approved

Documents Reviewed Concurrently:

Data Collection Tools: *MPolat_Individual Interview Questions.docx*
Data Collection Tools: *MPolat_Online Survey.docx*
HSPP Forms/Correspondence: *MPolat_F107 v2014-01.doc*
HSPP Forms/Correspondence: *MPolat_F200 SignaturePage.pdf*
HSPP Forms/Correspondence: *MPolat_F200 v2014-02.docx*
Informed Consent/PHI Forms: *MPolat_Consent form Turkish IEP Students.pdf*
Recruitment Material: *MPolat_Research Participation Invitation for Institution Administrators email template.docx*

This submission meets the criteria for exemption under 45 CFR 46.101(b). This project has been reviewed and approved by an IRB Chair or designee.

- The University of Arizona maintains a Federalwide Assurance with the Office for Human Research Protections (FWA #00004218).
- All research procedures should be conducted in full accordance with all applicable sections of the Investigator Manual.
- Exempt projects do not have a continuing review requirement.
- This project should be conducted in full accordance with all applicable sections of the IRB Investigators Manual and you should notify the IRB immediately of any proposed changes that affect the protocol.
- Amendments to exempt projects that change the nature of the project should be submitted to the Human Subjects Protection Program (HSPP) for a new determination. See the Investigator Manual, 'Appendix C Exemptions,' for more information on changes that affect the determination of exemption. Please contact the HSPP to consult on whether the proposed changes need further review.
- You should report any unanticipated problems involving risks to the participants or others to the IRB.
- All documents referenced in this submission have been reviewed and approved. Documents are filed with the HSPP Office. If subjects will be consented, the approved consent(s) are attached to the approval notification from the HSPP Office.

Appendix D

Informed Consent Form

APPROVED BY UNIVERSITY OF AZ IRB.
THIS STAMP MUST APPEAR ON ALL
DOCUMENTS USED TO CONSENT SUBJECTS.
DATE: 05/10/15

THE UNIVERSITY OF ARIZONA

The University of Arizona Consent to Participate in Research

Study Title: Emerging Technologies in Language Pedagogy: Language Learners' Perceptions through the Lenses of Innovation Diffusion and User Intention Theories

Principal Investigator: Mustafa Polat

This is a consent form for research participation. It contains important information about this study and what to expect if you decide to participate. Please consider the information carefully. Feel free to discuss the study with your friends and family and to ask questions before making your decision about whether or not to participate.

1. Why is this study being done?

This study is my dissertation research. It aims to identify language learners' approaches to technologies; to examine their attitude toward emerging technologies with a focus on their familiarity, actual use, intentions and perceptions; and finally to analyze the factors and relationships among these factors that best predict language learners' intentions and decisions to use new/emerging technologies.

2. How many people will take part in this study?

Approximately a maximum of 400 undergraduate students enrolled in intensive English programs of state and private universities in Turkey will be asked to participate through the distribution of the online survey. Follow-up interviews will be conducted with 16 volunteers from this group.

3. What will happen if I take part in this study?

Your consent to participate in this study will allow the researcher to:

- Have access to your responses to the survey which will give information about your use and intentions to use emerging technologies
- Answer a survey about your background and actual use of emerging technologies
- Collect more detailed data through interviews that will also be recorded for further transcription (if you volunteer to be an interviewee).

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4. How long will I be in the study?

This study will require your participation for 20-25 minutes if you take online survey. It will take approximately half an hour if you volunteer for interviews.

5. Can I stop being in the study?

Your participation in the data collection process is voluntary. You can refuse to participate or withdraw at any time. If you decide not to take part in the study, you may leave the study at any time. No matter what decision you make, there will be no penalty to you and you will not lose any of your usual benefits. Your decision will not affect your future relationship with The University of Arizona. You can stop your participation by contacting the principal researcher's advisor, Dr. Robert Ariew (ariewr@email.arizona.edu), or exiting out of the survey. In this case, the data you might have provided will not be used in the study.

6. What risks, side effects or discomforts can I expect from being in the study?

Your participation in this study does not involve any risk and no more than normal social and breach of confidentiality levels of risks might occur. It is known that there are no questions to be perceived as stressful or uncomfortable both in the survey and the interviews. However, in case of any unforeseen feeling of such, you can stop participating immediately.

7. What benefits can I expect from being in the study?

The study expects to present an understanding of language learners' perceptions and use of emerging technologies at intensive English programs in Turkey. Although the study will not provide a direct benefit to participants, there will be indirect benefits associated with the study's potential to generate self-reflection processes in participants. This could bring personal growth and a critical perspective regarding the adoption of emerging technologies depending on each individual.

8. What other choices do I have if I do not take part in the study?

You may choose not to participate without penalty or loss of benefits to which you are otherwise entitled.

9. Will my study-related information be kept confidential?

The information that you provide in the survey, and share during your interviews will be confidential. The use of a pseudonym instead of your name will help to ensure the privacy of information you provide. Thus, when findings are socialized your real name will not appear in these documents.

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Efforts will be made to keep your study-related information confidential. However, there may be circumstances where this information must be released. For example, personal information regarding your participation in this study may be disclosed if required by state law.

Also, your records may be reviewed by the following groups (as applicable to the research):

- Office for Human Research Protections or other federal, state, or international regulatory agencies
- The University of Arizona Institutional Review Board or Office of Responsible Research Practices

10. What are the costs of taking part in this study?

There are not any costs of taking part in this study except the time you allocate when you take the survey or volunteer to be interviewed when you take the survey.

11. Will I be paid for taking part in this study?

There will not be a monetary compensation for your participation in this study.

12. What are my rights if I take part in this study?

If you choose to participate in the study, you may discontinue participation at any time without penalty or loss of benefits. By signing this form, you do not give up any personal legal rights you may have as a participant in this study.

You will be provided with any new information that develops during the course of the research that may affect your decision whether or not to continue participation in the study.

You may refuse to participate in this study without penalty or loss of benefits to which you are otherwise entitled.

An Institutional Review Board, responsible for human subjects research at The University of Arizona, reviewed this research project and found it to be acceptable, according to applicable state and federal regulations and University policies designed to protect the rights and welfare of participants in research.

13. Who can answer my questions about the study?

For questions, concerns, or complaints about the study you may contact the principal investigator´s advisor:

Robert Ariew, Professor , ariewr@email.arizona.edu

THE UNIVERSITY OF ARIZONA

Or the main researcher:

Mustafa Polat mpolat@email.arizona.edu

For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact the Human Subjects Protection Program at 520-626-6721 or online at http://orcr.arizona.edu/hspp.

By participating in the following survey, you acknowledge and accept these conditions and give permission for the investigator to use your information for research purposes.

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